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INTERSTITIAL GINGIVITIS DUE TO AUTO-INTOXICATION; ETIOLOGY.

BY EUGENE S. TALBOT, M. S., D. D. S., M. D., LL. D., CHICAGO, ILL.

A few years ago the uric acid theory of the cause of interstitial gingivitis was revived when Dr. Pierce of Philadelphia amplified the theory of Dr. Reeves that pyorrhea alveolaris was due to uric acid or gout. In this article (*International Dental Journal*, Vol. 15, page 217, 501) Dr. Pierce reported three specimens of tooth deposit, examined chemically, in which he found numbers of fine needle crystals of calcium urates, a few crystals of free uric acid and crystals of calcium phosphates. Dr. Pierce based his theory of etiology upon these three cases. Being familiar with the uric acid theory of disease, I took exception. Wishing, however, to ascertain the percentage of cases in which uric acid crystals may be found in this connection, I instituted two series of experiments in two different laboratories, neither knowing the work of the other. One series was conducted by Prof. Salisbury in the Woman's Medical School Laboratory, the other by Prof. Wesener in the Columbus Medical Laboratory. One hundred teeth with calcic deposits were examined in each laboratory with the following results. Eight per cent responded to the microscopic and murexid tests in one report, in the other six per cent. The details in this report were published at the time (*International Dental Journal*, April, 1896). Since uric acid crystals were found in such small quantities and in such a small percentage of cases, it could not be considered a cause. I took the ground that the disease was due to trophic changes or disturbed nutrition. The uric acid theory of disease at that time had lost ground among thoughtful physicians. At the present time very

few believe in it. The prevailing theory is that uric acid is only an expression of systemic disturbance rather than a cause. The article by Dr. Pierce, however, stimulated me to further research and I have devoted my entire time since then to the study of etiology, pathology, diagnosis, therapeutics and treatment of this disease. From the standpoint of pathology more than four years were spent in study among animals and human beings, the result of which I published in my work upon "Interstitial Gingivitis or So-called Pyorrhea Alveolaris." This was necessary in order to obtain a basis for future work. In the past six years I have devoted my time to the etiology, diagnosis and treatment. For many years I had observed interstitial gingivitis among neurotics and degenerates as early as ten and twelve years of age. The absorption of the alveolar process and gums was also rapid in these people from eighteen years on. Soreness of the teeth and inflammation of the gums and alveolar process were observed in children suffering from the eruptive fevers and in women in pregnancy. These symptoms were also observed in the metal and drug poisons and scurvy. The older the individual the more severe the disease. The same law holds good with animals.

In changes of climate, from a moderate to a high or low temperature, causing the eliminating organs to become torpid, so that they cannot readily adjust themselves to food and environment, the disease in most cases was marked. These observations led me to inquire into the general condition of the system.

Bouchard has said that, "The organism, in its normal, as in its pathological state, is a receptacle and a laboratory of poisons. Among these are some formed by the organism itself, others by microbes—minute forms of vegetables—which either are the guests—the normal inhabitants—of the intestinal tube or are parasites at second hand and disease producing. Man is, in this way, constantly living under the chance of being poisoned; he is always working toward his own destruction; he makes continual attempts at suicide by intoxication. And yet this intoxication is only partially realized, for the organism possesses numerous resources which enable him to escape the intoxication which is always threatening. He throws off these toxic substances into a special reservoir, from which they afterward pass out, and, besides, the blood constantly subtracts from the organs the poisons as soon

as they are formed in them." When, however, these poisons are not entirely eliminated, the blood and system become charged with effete matter and auto-intoxication of self-poisoning results.

Auto-intoxication may be produced from poison generated within the body or introduced from without. Frequently patients have undergone the most simple and insignificant surgical operation, such as for hare-lip, or the most serious and prolonged, as removal of female genital organs, operations for gallstones or removal of the appendix, and recovered from the shock. At the end of a few days of apparent recovery they suddenly collapse and die. A post-mortem examination conducted with the greatest care reveals nothing as to the cause of death. Sudden deaths have occurred to numbers of people who have partaken of certain foods at church and other gatherings. Individuals have died in one, two, three or four days after eating sea foods and stale meats. Epidemics have occurred from poisoned foods and drinking water. Selmi, the Italian toxicologist, was the first to discover that substances were present in the system which, when combined with acids, formed chemical salts. These corresponded to inorganic and vegetable bases he called ptomains formed by the action of bacteria upon organic matter. The chemical salts resemble vegetable alkaloids. The term leucomaines or animal alkaloids is used to designate those basic substances caused by tissue metabolism in the body. Not all ptomains are poisonous. Some are inert. Brieger restricts the term ptomain to non-poisonous basic products, while those that are poisonous he calls "toxins."

In some diseases, poisons or toxins are poorly eliminated, in others readily, depending entirely upon the nature and location of the disease.

If the disease involves the entire system and all the eliminating organs, the skin, kidneys, bowels and lungs, are performing, or can be made to perform, their natural functions, many of the poisons are soon removed. On the other hand, if any one of these organs is involved, the process of elimination is slower, as the eliminating organs not involved must do all the work. At best this is imperfectly performed. The greater part of these poisons is eliminated by the stools. Owing to the slow movements of the intestinal contents, much of the poisons is absorbed by the mucous membrane. In faulty metabolism or tissue changes toxins are

produced which are absorbed and pass into the lymph and blood vessels. All poisons, producing intoxication, whether due to disease, tissue change, fermentation or infection, are of interest in their relation to interstitial gingivitis. Many of these auto-infections are of short duration and their intensity is not lasting. On the other hand, the toxins of mercury, lead, brass, drugs, syphilis, tuberculosis, scurvy, etc., are familiar to all. They are of vital importance to the patient and physician, since they act quickly, but are not of general interest at this time. The auto-intoxications of slow progress, those in which the system is becoming slowly poisoned, are the ones of vital importance, and are due to intestinal fermentation and tissue changes. These toxins are taken directly into the blood vessels and carried throughout the system. This has been repeatedly proven by Bouchard (Auto-intoxication in Disease). Another proof of this statement is the fact that in the products of secretion of the eliminating organs, those poisons which are produced in the intestinal canal are found.

That man was born free from microbes was first demonstrated by Metchnikoff. Soon after birth the skin and mucous membrane become infected, either from the air or water used in bathing or both. On an examination of the intestinal contents an hour after birth, during warm weather, bacteria were found. Usually bacteria are not observed until from twelve to twenty hours after birth. Micrococci and bacilli flourish independently of food, for they are found in the alimentary canal before nourishment has been taken. These microbes change in character when mother's milk or other foods are given the child. The bacillus bifidus appears with mother's milk. The colon bacillus, streptococci, staphylococci, lactic acid bacilli, etc., with cow's milk. Later, with the changes in diet, whether purely vegetable or animal, microbic flora grow rapidly in the intestinal tract. Vignas and Suckdorf have shown that an adult man passes from 30,000,000,000 to 50,000,000,000 of bacteria daily from the feces. Many, perhaps most, of these bacteria are harmless in healthy individuals. They become exceedingly virulent after accidents or injuries, such as gun shot, knife or other wounds, strangulated hernia and catarrhal conditions of the mucous membrane. Man therefore is in constant danger of being infected. The injury resulting from these

micro-organisms, from the standpoint of this paper, is not from the bacteria themselves, but from their toxins, the products of which are absorbed.

Auto-intoxication, without other pathologic states, is due to the absorption in the gastro-intestinal tract, of toxic material due to metabolic changes. This is assisted by hepatic insufficiency and a want of muscular tonicity to expel the accumulation.

Before considering farther the putrefactive changes within the intestinal canal, I wish to speak here of a subject about which I find little of note by previous writers, namely, changes in the digestive tract due to evolution. Evolution is based upon the law of economy of growth, laid down by Aristotle, or use and disuse of structures. It is applicable here as in other parts of the body. Man, as a whole, has undergone rapid changes and is still undergoing greater and greater specialization. In no structure of the human body are these changes so great, owing to disuse, as in the digestive tract. When organs are exercised, like the arms of the blacksmith, the hands of the oarsman, the legs of the mail carrier, they become enlarged and strong. On the other hand, when any organs are not used, like the little muscles of the ear, the small ribs, the little toes, the blood does not flow to the parts in proportion and arrest of development results. I have repeatedly shown many times the arrest of the face, jaws and teeth in the evolution of man due to disuse. Civilization, its custom of preparing food and etiquette in eating, has caused rapid degeneration of the jaws and teeth, resulting in irregularities and decay. The mastication of food is a lost art with many people, the salivary glands are not excited, arrest takes place and saliva containing ptyline is scanty. Foods cooked and swallowed without mastication are taken into the stomach without the preparation of first digestion. The gastro-intestinal juices are required to perform all the work. Changes in the liver, either as to size, quantity of bile secreted or disease, causes hepatic insufficiency. The same is also true of the pancreas and gastro-intestinal juices. The size of the stomach, the length and deformity of the intestine, should also be considered, and last but not least, the condition of the nervous system, and the power of the muscular coats of the intestines to expel the contents from the body.

The evolution of the rectum and anus from the placental and

oviparous mammals is interesting, but is too broad a subject to be considered in this paper. This evolution, however, in its relation to malformations and muscular tonicity, must not be lost sight of in the study of gastro-intestinal irregularity.

The sedentary life, due to modes of living, has brought about many of these changes. The digestive apparatus has not had time to readjust itself to the new environment. Micro-organisms and pus germs which have accumulated in the mouth are taken into the stomach and intestines with every swallow. These must produce injurious results. While the function of digestion is to convert albuminoid substances into peptones, alkaloidal poisons are produced together with toxic substances due to intestinal fermentation. These, together with other poisons due to metabolic changes, pass into the lymphatics and blood vessels.

Direct demonstration of this fact has been shown by many investigators. Planer, after ligating the colon, found H_2S in the blood of the portal vein. Carter has found indigo in animals, the subjects of intestinal derangements. Bouchard as well as Planer has observed alkaloids, not only in the tissues, but in the blood. Poisons formed, not only in the intestines, but also those existing in the tissues, are also observed in the urine.

That an increase in intestinal fermentation will cause a large quantity of toxic material to pass through the blood into the urine has been demonstrated many times. Stadeler in 1848 found phenol in the urine. Bauman in 1877 found phenol in fecal matter. In 1826, Tiedeman and Gmelin discovered a red colored substance in the duodenum which proved to be indol. Braconnot later found in the urine indican derived from indol. In 1872 Jaffe injected indol under the skin and afterward found indican in the urine. Later experiments by Senator failed to find indol in the meconium or indican in the urine of newly born infants. It is an established fact to-day that the variation of indican in the urine is governed by the quantity of indol in the feces. In other words, the amount of indican in the urine depends upon the activity of intestinal fermentation. In cholera, typhoid fever, intestinal obstruction, Hassal, Gubler, Robin, Carter, Jaffe found large quantities of indican in the urine. Senator showed indican in the urine in constipation.

Nencki gave a dog two grains of indol by the mouth, and in

twenty-four hours there appeared diarrhea. Twelve milligrams of a one per cent solution administered subcutaneously to frogs caused death. One and five-tenths to two grams of indol administered subcutaneously to a rabbit in twenty-four hours proved fatal. By similar experiments Salkowsky found phenol and cresol in the urine. Especially was this the case in diarrhea and in intestinal obstruction. There is no doubt that in future investigations other poisons will be found in the stools and urine that produce marked poisonous effect upon the system. Putrid matter formed in the intestines, found in the urine, must of necessity circulate in the blood throughout the system. There is a natural fermentation going on all the time in the intestines. In young and middle aged people, when the tonicity of the excretory organs are normal and performing their office in a healthy manner, the kidneys, bowels, skin and lungs remove the poisonous products from the body. When, however, putrid matter is formed in excess, or the excretory organs have lost their tonicity, has the system other means of preventing the accumulation of poisons in the blood? Certainly, the liver is intended to perform that office. This has been proven by Schiff. The experiments by G. H. Roger with alcoholic extract of rotten meat show that when injected into the portal vein it is twice less toxic than when introduced into the circulation.

Bouchard has shown that blood drawn from the portal vein of a dog kills a rabbit in a dose from thirteen to sixteen cubic centimeters per kilogram; that blood removed from the liver requires twenty-three centimeters. He has also shown that the injection of the extract of 2.5 grams of decomposing meat is sufficient to kill a man.

Many other experiments have been made by scientists showing similar results. In a summary of the research work, it is safe to say that the liver is intended to give protection to the system when the excretory organs are unable to perform their function.

When all conditions work in harmony, that is, when animal and man, after years of normal environment, have adjusted themselves, disease is less likely to result. When a change of environment, such as food, climate and soil, takes place, the animal or man becomes more susceptible to disease. Thus fifty-five monkeys died of tuberculosis in the Lincoln Park Zoo, Chicago, in one

year, due to change in food and temperature and to confinement. House dogs are more susceptible to disease than street dogs. The Indian of North America has been, and is, dying rapidly from change in environment and food. This is true of other primitive races throughout the world. Scandinavians in American cities are very susceptible to disease. The same is true of the negro.

Many people are still in the primitive stages as regards their digestive apparatus. They have inherited an atavistic tendency in their large, well-formed jaws, muscles and teeth. They masticate food and enjoy it like the carnivora, tearing and chewing meat from a bone. The digestive apparatus is perfect, the bowels, kidneys, skin and lungs do their work normally, and they are in perfect health.

Many in whom the digestive apparatus is weak have progressed along the line of evolution. These people live a sedentary life one or two generations in advance of the tiller of the soil. They are in the transitory stage, not yet adjusted to the new environment. A third class, born of neurotic parents, have inherited deformed internal organs the secretions and action of which are not in harmony with each other. They do not chew their food, and digestion is impaired. Their nervous systems may be impaired from the first, or may become involved as a result of faulty digestion and assimilation.

Studying the three classes singly, it is found that the first class are healthy, that they can eat and drink everything and at all times, day and night. They can eat eight or ten meals a day, "like the King of Portugal," and enjoy them. They can drink large quantities of alcohol or beer each day without difficulty. They are rarely ill. When the senile stage begins, while there are no marked symptoms, the excretory organs fail to perform their work properly. Interstitial gingivitis sets in, the teeth loosen, arteriosclerosis, kidney breakdown, uremic poisoning result, and at from fifty-five to sixty-five death takes place from Bright's disease, diabetes, heart failure or apoplexy, the result of excesses.

The second class easily produce acute gastro-intestinal fermentation, auto-intoxication, and are subject to sick headaches, acid stomachs, gases in both stomach and bowels, constipation. They suffer with headache, migraine and vertigo, and often with nervous symptoms. In these cases special foods will upset the entire sys-

tem. Fruits, raw as well as cooked, set up fermentation in the small intestines and putrefaction results. Coffee, chocolate, cocoa, beer, and the inhalation of tobacco smoke will stop the secretion of bile, produce cold extremities, sick headaches in a few hours, and not infrequently skin eruption.

The third class are not only subject to all the symptoms of the first and second, but frequently surgical operations are necessary to establish healthy relations between the digestive organs.

Deformities of the jaws and teeth are not uncommon. Macaulay portrays a vivid picture of such a state in Charles the fifth of Spain. Among other physical deformities, he says, "At length a complication of maladies completed the ruin of all his faculties. His stomach failed, nor was this strange, for in him the malformation of the jaws, characteristic of his family, was so serious that he could not masticate his food, and he was in the habit of swallowing ollas and sweetmeats in the state in which they were set before him. While suffering from indigestion, he was attacked by ague. Every third day his convulsive tremblings, his dejection, his fits of wandering, seemed to indicate the approach of dissolution."

Prof. Russell H. Chittenden (Physiological Economy in Nutrition), in his experiments in physiological economy in nutrition, has shown that excess of proteids means waste, "but of far greater importance is the unnecessary strain placed upon the body by this uncalled-for excess of food material, which must be gotten rid of at the expense of energy that might better be conserved for more useful purposes."

He has conclusively shown that body equilibrium can be maintained on half of the daily intake of food. The brain worker and the muscle worker can maintain health, strength and vigor on a smaller amount of nitrogenous material than is usually consumed, "that an excess of food is in the long run detrimental to health, weakening rather than strengthening the body and defeating the very objects aimed at." This applies to people who have obtained their growth, and not to children.

Neurotics and degenerates are very susceptible to auto-intoxication on account of an unstable nervous system. They either become easily constipated or toxic material accumulates in the intestines, and as a result the system becomes slowly poisoned. Con-

vulsions occur in both children and adults. Most, if not all, insane patients are constipated. While it would not be safe to say that the insanity was due to the constipation, yet all are greatly benefited, and some slight forms are cured, by keeping the bowels free from microbic infection.

Some of the best specialists claim the skin eliminates very little of the blood's poison. Under ordinary circumstances the skin excretes water, salts in small quantities, carbonic acid, and in some volatile fatty acids. As age advances and the eliminating organs lose their tonicity, the bowels and kidneys fail to eliminate all the decomposed material. When these organs become diseased, the skin and lungs assist in carrying off the poisons or their products. The skin especially is important in keeping the system in a healthy condition, free from poisons. The change from heat to cold and vice versa has been beautifully shown in the Spanish-American and Boer wars, and in the building of railroads in high altitudes, especially in Switzerland. Soldiers and men have become poisoned from a want of quick adjustment of the eliminating organs to heat and cold, this, together with a change in foods, resulting in what many physicians have called scurvy, but what was, in reality, simple interstitial gingivitis.

What the laity understand as "spring fever" is but the readjusting of the eliminating organs from winter to spring. People in the senile stages feel better in warm climates than in cold, hence the custom of moving to warm climates in winter.

During pregnancy the system of the mother is filled with poisons from maternal as well as fetal circulation. The excretory organs are overtaxed by the poisons resulting from intestinal fermentation of the mother and the cell changes in both organisms, hence the neuralgias, rheumatic pains, cramps, interstitial gingivitis and convulsions so frequently observed.

One accustomed to the odor of the skin and lungs, and to an examination of the mouth in which there is interstitial gingivitis, can readily detect intestinal fermentation and kidney irregularity. Many times I have detected a tendency to kidney lesions or the lesion itself, in this manner, as was confirmed by subsequent urinalysis.

Auto-intoxication in disease is familiar to all. That the blood is charged with effete matter or poison, due to auto-intoxication, is

abundantly proven. Oxygenation of the blood cannot be properly accomplished by nose breathing. More air is necessary, hence the unconscious opening of the mouth. A larger volume of air by nose and mouth is therefore taken into the lungs. Most people at the senile stage do this, most noticeably, however, at night.

The poisonous products of the intestinal canal not expelled from the bowels are absorbed and carried by the portal system to the liver. If sufficient bile is secreted to destroy the toxic material it will be carried back and emptied into the bowel. If, owing to some mechanical obstruction, as catarrhal swelling, gall stones or thickening of bile, the normal function of the liver should be interfered with, hepatic insufficiency results. Any derangement of the bile or liver cells which interferes with the proper function of rendering harmful substances innocuous would cause abnormal and poisonous products to be carried in the blood. The liver, therefore, is responsible for whatever toxic material remains after it leaves the intestines.

The great outlet for poisons, which the liver fails to eliminate, are the emunctories, chief of which are the kidneys. If there be too much work in this direction the eliminating function is soon lost. The toxic material accumulates and results in renal inflammation and albuminuria. When this has taken place the blood becomes charged with poisons, the heart and arteries undergo degenerative changes with cardiac hypertrophy, and arteriosclerosis, the many consequent cardio-vascular diseases, insufficient blood supply to various vital organs, nervous disorders, Bright's disease, diabetes, rheumatism, gout, uric acid diathesis, skin eruptions and asthma result. Before these diseases have become of sufficient importance to be observed by the physician, interstitial gingivitis has obtained full sway. In all the above mentioned diseases interstitial gingivitis is most pronounced.

THE ETIOLOGY OF DENTAL CARIES.

BY H. B. TILESTON, D.D.S., M.D., LOUISVILLE, KY. READ BEFORE THE KENTUCKY STATE DENTAL ASSOCIATION, JUNE 12, 1906.

A thorough knowledge of the etiology of a disease is essential to the intelligent application of a remedy for that disease. This is an axiom as true in dentistry as in medicine.

The disease that the dentist is called upon to treat most frequently, in fact constantly, is dental caries, and he who is not familiar with the accepted cause of this disease has been negligent of his duty and his opportunities.

No doubt the members of this association, as well as the profession generally, have at some time been perfectly familiar with the theories, accepted quite universally as facts, with reference to the etiology of dental caries, but in the lapse of time they may have become more or less rusty as to some of the phases of the subject, and it is for the purpose of bringing back to your minds old familiar things, and not with the expectation of telling you much that you do not already know, that I present this paper.

There is no theory in the entire realm of pathology that has been so completely and absolutely demonstrated to be a fact as has that of the exciting cause of dental caries. The announcements made by Dr. W. D. Miller of Berlin in 1882, giving the results of his experiments to determine the etiology of dental caries, have never been controverted. Investigations and countless experiments made since that time by Drs. Miller, Black, Leon Williams and others, have brought out much additional information, and much remains yet to be done—but the result of all these investigations has been to establish more firmly the germ theory of dental caries.

In the light of our present knowledge the theories that preceded the germ theory appear ridiculous, and yet it is not beyond the realm of possibilities that new ideas and facts may be brought out within our own times that will overturn our accepted ideas as completely as the germ theory has overturned those that preceded it. In view of the apparently perfect demonstration that has been made of the germ theory, however, it is hardly probable that it will ever be completely controverted, though it may be quite radically modified.

It might be interesting to sketch briefly some of the exploded theories as to the etiology of dental caries, not only as a matter of history, but to show that while Dr. Miller's announcements were somewhat startling and were accompanied with demonstrations which were accepted as conclusive, they were not entirely new, but were the culmination of investigations which had been going on for centuries, and which naturally, by a species of evolution, led up to the results promulgated by him.

Previous to the invention of the microscope, no scientific investigation was of course possible, and the earlier theories of the cause of caries were based entirely upon observation and clinical experience.

The earliest theory of which we have any record is the Humeral Theory advanced by Hippocrates 450 B. C. He taught that the body contained four fluid humors, viz., blood, phlegm, yellow bile and black bile; that a proper balance of these fluids constituted health while any disturbance of this balance resulted in illness. He ascribed dental caries to a stagnation of the fluids of the teeth resulting in coagulation and putrefaction, which was followed by decay. This theory was maintained as late as 1757 by Bourdet, whose contemporaries, however, had long since accepted the Vital or Inflammatory theory advanced by Galen 131 A. D., who attributed caries to a disturbance of the functions of nutrition. Ambroise Paré, in 1579, Pierre Fauchard in 1723, Jourdain 1776, Hunter 1778, Fox 1806, Bell 1831, and Fitch in 1835, all subscribed to the Inflammatory theory, maintaining that dental caries was of internal origin and was caused by inflammation of the pulp resulting in a necrosis of the pulp membrane at some point, thus cutting off the nutrition of the tooth tissues opposite that point, causing putrefaction of the dentin which finally appeared on the outside of the tooth as a cavity. Abbott, as late as 1879, and Heintzmann and Boedecker in 1886 and 1888 made an effort to revive the vital theory of dental caries.

Another theory was the Worm Theory, which is of uncertain date but was apparently seriously held by some ancient writers.

It may have been maintained through ignorance, or may possibly have been used as a deliberate deception, which the Chinese are said to practice to this day, extracting and displaying artificial worms to satisfy the suffering patient that the cause of his trouble has been skillfully removed.

The Putrefaction Theory of caries was advanced by Pfaff in 1756. He says, "Remains of food which undergo putrefaction between the teeth occasion decay of the teeth."

Facinus, in 1847, attributed caries to a putrefaction induced by certain minute infusorial animalcules, and Klencke, in 1850, maintained the putrefactive theory and said that it was sometimes caused by an animalcule and at other times by the proliferation of a vege-

table parasite. This was approaching near to the truth as we know it today.

The Chemical Theory which was held until recent times, which was in fact the accepted theory, up to the time when Miller proved the disease to be caused by the zymogenic bacteria, was really a retrograde step. The Mineral Acid Theory of Watts was taught when I was in college. He held that caries was caused by the three mineral acids, nitric, hydrochloric and sulphuric, the nitric producing the white decay, the sulphuric the black and the hydrochloric the intermediate colors. This theory did not attempt to account for the localization of caries in cavities.

The Electro-chemical Theory was promulgated by Bridgman in 1861-63, the most notable advocates in this country being Drs. Palmer, Chase and Flagg of the New Departure fame. This theory was based upon the idea of the simple galvanic battery discovered by Faraday. It was held that a tooth in a living body was always polarized, the root invested in the gum and alveolus being always electro-positive, while the crown, being exposed to the atmosphere, was electro-negative. This condition resulted in galvanic action which formed, by electrolysis, acids which produced decay.

Metal fillings in the teeth increased the galvanic action and accounted for secondary caries.

The Germ Theory came next, and while W. D. Miller was its most notable advocate, he was not the first to attribute the cause of dental caries to the action of germs. Erdl in 1845, Ficinus in 1847, Klenke in 1850, Leber and Rottenstein in 1867 and later Milles and Underwood, and Koch in 1881, had all suggested the agency of micro-organisms in the production of caries of the teeth. It remained for Dr. Miller to prove the case conclusively.

He seems to have started out upon his experiments with a very clear conviction that germs were the active agencies in this disease. He first convinced himself, by the examination of thousands of slides of carious dentin, that micro-organisms were always present.

One of his first experiments was to fasten, upon going to bed, a tube, containing a mixture of starch and saliva, to the side of a molar tooth. In the morning the mixture was sour, showing that fermentation had taken place. The ptyalin of the saliva had first changed the starch to sugar, and afterwards germs had caused the mixture to become acid. He next heated the starch to 100° Centi-

grade, sufficient to kill any germ, and repeated the experiment. It soured as before. The saliva was then heated to near boiling, when the mixture with the starch remained sweet, thus proving that the germ resided in the saliva. By inoculating other culture tubes from the first he proved these germs to be reproductive. By analysis he found the acid produced to be lactic. No specific germ has ever been isolated as the active agency in the production of caries. Out of the fifty or sixty varieties to be found in most mouths there are quite a number which produce lactic acid. Out of eighteen examined by Dr. Miller, ten were lactic acid producers. This variety of bacteria depend for their growth upon the presence of carbohydrates, substances which are either in the form of sugars or are capable of being converted into sugars in the mouth.

Dr. Miller's crowning demonstration was the production of typical caries in an extracted tooth under conditions similar to those found in the human mouth.

He later made the important announcement that caries is produced by the action of two varieties of germs, or by the same germs acting differently in the different stages of the disease. First the Zymogenic bacteria or acid producers dissolve out the lime salts, after which the Saprophitic bacteria, or those capable of causing putrefaction, attack the organic matrix, breaking it down into the characteristic appearance of caries. The acid action always precedes the actual presence within the cavity of the germs themselves. Dentin which has been acted upon by the acid in advance of the germ is said to be "affected" and when the germ has entered into the dentinal tubules it is said to be "infected," a distinction of importance when determining what carious matter or semi-carious matter may be safely left covering a nearly exposed pulp.

Besides this active or exciting cause of caries we have the many predisposing causes, chief of which is what is known as structural defects, pits and fissures. It is easy to comprehend how these imperfections favor the beginnings of caries. Dr. Leon Williams has written quite extensively to show how caries may originate on smooth surfaces of enamel by the formation of plaques of bacteria adhering to the enamel, under which plaques the lactic acid is proliferated and dissolves the enamel. Dr. Black has also written much on this phase of the subject. In his paper read before the fourth International Dental Congress at St. Louis, Dr. Miller stated

that these plaques played a very unimportant role in the production of caries.

He showed a number of specimens on the screen to demonstrate that the so-called plaques really had acted as a protection to the enamel, while at other points not covered by the plaques, caries had progressed to a marked degree.

In the discussion of this paper Dr. Black stated that the kind of plaques shown by Dr. Miller were not the kind to which he (Dr. Black) had reference, when claiming that caries on smooth enamel surfaces was initiated under bacterial plaques clinging to the surface. He doubted, he said, if Dr. Miller had ever seen the transparent almost invisible plaque which he (Dr. Black) had studied and grown artificially, and under which he had frequently found extensive caries of enamel.

It seems to me quite possible that an aggregation of bacteria in the form of a plaque might in one instance, being largely admixed with fat, act as a protection to the enamel directly beneath it, while in another case, the fats being absent, acid solution of enamel would occur.

While no specific germ has yet been isolated to which could be attributed caries of the teeth, efforts in that direction have not been wanting. Some years ago Goadby of London announced the discovery of a germ which he found in the deeper layers of the debris of caries, which he believed to be the true etiological factor in this disease and which he named the "Necro dentalis." So far he has not made good this claim.

Vicentini of Italy sent a paper to the Fourth International Dental Congress on the "*Leptothrix racemosa*," a micro-organism discovered by him some years ago and which he claims to be the parent of all or most of the organisms found in the human mouth; all others representing simply the different stages of development of *leptothrix vacemosa* from the spore to the fully developed organism. He does not subscribe, however, to Dr. Miller's conclusions that the etiology of dental caries is entirely external to the tooth, but tends rather to the recent view of Dr. Eben M. Flagg of Asuncion, Paraguay, that caries is an eruptive disease proceeding from the inner to the external part of the tooth.

Notwithstanding the fact that so much of value has already been done along this line of investigation, there still remains much to be

cleared up. Many questions remain unsatisfactorily answered. Why are some individuals immune with conditions in the mouth apparently the same as in those in which caries is extensive? Why are some teeth in the same mouth apparently immune and other teeth are largely affected? Why is it that in some cases we find one tooth decayed almost to pulp exposure and the approximating tooth directly in contact with the carious matter only slightly affected or not at all? Why is it that in some mouths fillings arrest caries almost absolutely while in others caries is reestablished about good fillings almost as soon as it is possible for the disease to get another start?

We are sure of one thing, that caries is essentially a filth disease. Knowing this, what system of prophylaxis may be adopted and recommended that will put a stop to the progress of this dread disease?

These are questions which offer food for thought and a large field for further study and investigation and we await a Moses to lead us out of this wilderness of interrogation points.

THE TREATMENT OF SOME PHASES OF ALVEOLAR ABSCESES.

BY GEO. W. COOK, D.D.S., CHICAGO. READ BEFORE THE SOUTHWESTERN MICHIGAN DENTAL SOCIETY AT NILES, MICH., APRIL 10, 1906.

The successful treatment of any disease process, and especially the treatment of any local inflammatory condition, whether or not there is a tendency to pus formation, hinges upon a proper conception of the stage of tissue change, the kind of tissue that is involved in the process, the amount and quality of the exciting cause, and upon a full recognition of the predisposition of certain tissue to be acted upon, and the virulence of the infection that enters the tissue.

The tissue that is involved in an alveolar abscess, because of its anatomical and histological structure and its physiological function, has certain protective tendencies, considerable power of immunity, and a destructive influence on bacteria themselves. Too, the general physiological condition of the individual may play an important role both in bringing about a predisposition to certain local inflammatory

processes and in producing certain changes in the organisms that find a habitat in the oral cavity.

Many persons suffer from chronic alveolar abscesses, with sinous openings, through which the broken down tissue cells are discharged into the oral cavity. These may contaminate the oral secretions in such a way as to prevent their physiological action on the food that is being introduced into the alimentary tract, for the purpose of replenishing the waste products of the body. This contamination of the secretions may not bring about any appreciable change in the general health of the individual for an indefinite period, for it is a well-known fact that the gastric juice possesses marked antiseptic and germicidal properties, and that the bacteria that pass into the stomach by way of the saliva may be so acted upon that their effects may not be observed until the individual finds himself susceptible to other more serious diseases. Therefore, persons suffering from chronic alveolar abscesses, such as have just been mentioned, are more or less subject to certain constitutional disturbances, the initial cause of which would scarcely be traced to this almost unrecognizable condition in the mouth.

It is the duty of the practicing dentist to constantly bear in mind, that upon the efficiency and skill with which he treats teeth preparatory to crowning and filling, may possibly depend the health and usefulness of the individual who is receiving treatment at his hands. A very large majority of these chronic alveolar abscesses are the result of improper treatment of teeth preparatory to crowns and fillings.

Chronic inflammatory conditions in the tissues about the apical ends of the roots of the teeth are usually brought about by the continuous, mild irritating action of a form of bacteria which possesses but little virulency and therefore is incapable of setting up a disturbance of sufficient activity to establish a sinous opening. In such cases, degeneration of the tissue cells around the foci of irritation, takes place and we then have what is usually designated, a blind chronic alveolar abscess. This mild degenerative condition of the tissues may continue for some little time with only a slight soreness of the tooth, but at some unexpected time may change to a process more or less acute and a pronounced soreness, and a more or less uncomfortable feeling when the jaws are brought in occlusion, follow. Sometimes this mild disturbance may continue for a long

time spreading in a certain line into the canceled tissue around the apical end of the root, or it may spread in a direction following certain lymphatic structures, until considerable tissue has been destroyed and it has assumed such proportions that the tissue cannot resist the disintegration increased by bacteria of a more virulent nature. The products enter into the lymphatic circulation and are carried to a remote part of the body, there to exercise a more destructive and deleterious influence on the tissue in that vicinity.

The treatment of such conditions as the above mentioned, must always vary with the extent of the destructive process, and with the general physical condition of the patient at the time he presents for treatment. One of the very essential things in such cases, especially if there be no sinous opening, is to gain access to the infected area, through the root of the tooth, and determine, as far as possible, the extent of the lesion. When this initial mechanical process has been completed the question that first presents itself is, How proceed, and what agents can best be used? One thing that must be avoided, as far as possible, is the establishment of an acute inflammatory condition, for the simple reason that if there is an extended tissue degeneration in the locality of the abscess, there will be more or less pain and a far greater destruction of the tissue if anything be done to increase the inflammation. Therefore it is essential that the introduction of strong escharotic agents or those that are volatile in their tendencies, be avoided. The escharotic agent will cause a further destructive change in the tissues, and as the tissues may still retain sufficient physiological function to regenerate themselves, provided the bacteria are arrested in their activity for a sufficient time to allow the poisons to be thrown off and neutralized, escharotics are plainly contra-indicated. If a volatile agent be employed, and especially if it be confined, by sealing the cavity in the tooth, as the process of volatilization of the agent goes on the inactive bacteria will be carried into the surrounding tissues. These tissues have but little power of resistance, and there will be established a more active process, resulting in an acute abscess, a condition that must be avoided.

Right in this connection it may be well to mention that the regenerative processes of the bony structure is never as rapid as that of soft tissue, and furthermore its regeneration is always established in such a way that certain morphological rearrangements of the

cells goes on for a considerable time after apparently a normal physiological condition has been established. During the period between the elimination of the bacterial irritant and the establishment of a normal condition, teeth should be allowed to rest, and the operations of filling with gold or fitting bands for crowns, etc., should be postponed for at least two or three weeks. In other words, the part should be allowed to rest for a sufficient length of time that the tissues may regain a normal mechanical resistance to irritating agents that are not infectious in character. Therefore, agents used in the treatment of these conditions should possess the quality of stimulating the tissue cells as well as that of arresting the development of the bacteria present.

The profession is constantly having brought to its notice agents that are purported to be antiseptic and germicidal, recommended for filling root canals and remaining as a permanent antiseptic. Carbolic acid has been one of the agents that the profession has used generally in cases of chronic sinous abscesses, and today many claim it superior to anything tried in the treatment of such conditions. Possibly there is no agent that can be as successfully and universally used by the inexperienced, in sinous abscesses, but there are many agents that are quite superior if one will study the pathological conditions he has to treat. In case of sinous abscesses in which there is only a sinous without much tissue degeneration around the apical end of the root, an agent that I have tried with considerable satisfaction is guaiacol carbonate, a combination of guaiacol and carbolic acid, the chemical formula of which is $(CO(OC_6H_4OCH_3)_2)_2$. This agent has antiseptic power sufficient to destroy the form of bacteria that usually enters into such processes, is little escharotic and a mild stimulant to the tissue cells. In the treatment of those cases in which a mild disinfectant is required and tissue stimulation is indicated, this agent is one that is of value. It is also valuable in the treatment of certain antrum troubles.

In the so-called blind abscesses, those in which there is no sinous opening, it is important that the treatment be different. The guaiacol carbonate in the pathological conditions attending blind abscesses would, unless carefully handled, prove to be slightly irritating, because it has been observed that when this agent is confined in the root of the tooth, at body temperature, it sometimes

becomes sufficiently volatile to penetrate the tissues and establish a condition that we wish to avoid, namely, acute inflammation.

In blind abscess in which there is but little destructive change in the tissue at the apical end of the root and in which possible discoloration of the tooth is of no special consequence, there is probably no agent that will give the satisfaction as that of a ten or fifteen per cent solution of chinisol. But as I have elsewhere stated this agent must be handled with the greatest care if discoloration of the tooth structure is to be avoided. Chinisol has the distinctive value of being extremely germicidal when brought in contact with such bacteria as are usually found in chronic alveolar abscesses in which there is a slight but continuous degeneration of the tissue, the bacteria being but slightly pathogenic in their tendency. Chinisol may also be said to be beneficial in cases of antrum trouble in which there is but little pus formation, for instance, in those cases in which there is a mucous degeneration of the tissues following a catarrhal inflammation. Chinisol when introduced into large pus cavities is rapidly neutralized by the pus, consequently its effects are not as beneficial in large pus cavities as that of the guaiacol carbonate.

NARCOTILE ANESTHESIA.—The beauty about narcotile anesthesia is its pleasantness. Patients are insensible to pain long before they are past talking. I can go ahead and operate, the patient being almost entirely conscious, but feeling slight or no pain. I have given narcotile and removed temporary abscessed teeth for almost babies who would find no objection save that "that stuff made their ears roar." The patient always recovers completely in about five minutes, and there are no after-effects.—W. H. REABEN, *Practical Dental Journal*.

A WORD OF CAUTION.—Never fill a root canal at the same sitting after the removal of a pulp with cocain, particularly when adrenalin is combined with the solution. First, because of the secondary hemorrhage, and, second, the tissue surrounding the apical space being anesthetized, renders it impossible to work with the same degree of accuracy as when this space is sensitive, especially when forcing in the root filing.—S. MARSHALL WEAVER, *Cleveland, O. (Dental Magazine)*.

A SYRINGE AND INSTRUCTIONS.—Dr. J. P. Root of Kansas City says: "No pyorrhea patient or one with a number of crowns or extensive bridge-work ever leaves my office without instructions to purchase a water syringe and a bottle of Glyco-Thymolin, or similar solution, and use the same daily, washing out all pockets and inaccessible places on crown or bridges."—*Kansas City Dental Journal*.

Digests.

ETHICS. By A. H. Peck, M.D., D.D.S., Chicago, Ill. We are children of the past. Into our lives are built forces and tendencies that come through the ages from a time concerning which history is silent. Through the centuries man has been slowly climbing from barbarism to civilization, from selfishness to unselfishness, from egoism to altruism—and the ascent has not yet ended. What a picture would hang before us, could we have a faithful portrayal of the process by which the race has come to its present condition! Yonder in the dim past, man emerging in self-consciousness, improvident, self-contained, brutal. Then the birth of sympathy, mutual helpfulness, and moral standards. We are far from being perfect. Selfishness still seeks hospitality in our hearts, and brutality lurks around the corner ready to waylay and overcome us. But the imperfections and weaknesses of to-day are far from proving that no progress is being made. It is easy to so fill our minds with the evil that is all about us—with the crime which defies control and shames our modern civilization—as to cry that the world is dropping downward instead of climbing upward—that we are degenerate children of our fathers. We need to take long-time views of life, to mark carefully the flow of the stream which runs through the centuries, lest we mistake the eddy for the current and form mistaken judgments concerning humanity's real tendency.

The study of origins is always interesting, even if not uniformly profitable. Men have busied themselves in seeking for the sources of moral life. When, in our fierce struggle for existence, did men first give room to sympathy? How was it that out of selfishness unselfishness was born? Where was it, and when, that men rested from their mutual aggressions and began to help each other? The pages of history are silent, and no voices come to us from those primeval days. Interesting as is the quest, it is a vain one, and for our present purpose unimportant. We have to do with men as they are and society as it is. It is our business, in full recognition of the existence of ethical standards and of present-day conditions, to ascertain what we ought to do and to be. What is the true function of a man in the

social organism? And what special opportunities and duties are ours as members of a profession?

There are two great outstanding principles of conduct which have application to every member of society and upon the recognition of which the welfare of society depends: viz, (1) a man shall inflict no injury; (2) he shall be helpful. Have we not here a summary of conduct within which may be brought all our relations and activities?

Turning first to the negative side, a proper ethical standard will keep us from being harmful. This may at first glance seem a very poor and inadequate setting forth of moral duty, but when we come to consider it in all its laterals it will be found to hold tremendous significance. It means far more than that we shall refrain from murder and theft and arson. These are crimes recognized and punished by laws. These are crimes so abhorrent to respectable men that they hold no temptation for us. But there are injuries perpetuated of which the law takes no cognizance, extra-legal wrongs which involve neither fine nor imprisonment. And they are not unimportant wrongs judged from the point of view of individual or social welfare:

Who steals my purse steals trash; 'tis something, nothing

* * * * *

But he that filches from me my good name

Robs me of that which not enriches him,

And makes me poor indeed.

Just here we come upon a temptation to unethical living that touches the best of us, and against which we must do battle if we are to live worthily. It is a temptation to which professional men, possibly, are peculiarly susceptible, our own profession not excepted. Take a concrete case: Two men begin the practice of their profession in the same place, at the same time. Each has his living to make, his professional reputation to establish. Each desires to make friends, attach himself to a clientele, succeed. Is it not hard for these men to be absolutely fair in their treatment of each other? Does not jealousy often lead to innuendo, and hint, and shrug of shoulder, if not to specific and open charges? Do not misunderstand me. I am not saying that this is always so; possibly it is not often true; but the temptation is there, and the demand for a lofty and noble ethical standard is there also. From a purely selfish point of view, the

attempt to rise by the fall of another is poor policy. It is true that

Men may rise on stepping-stones
Of their dead selves to higher things,

but no man ever climbed higher in manhood by trampling on another.

This temptation multiplies its strength when our competitor for the favor of the public is for any reason disagreeable to us. Nothing is more difficult than to be absolutely fair to the man whom we dislike. He may be endowed with superior skill, but it is hard for us to acknowledge it. He may be industrious and honest, but we are looking for evidences of his laziness or proof that he is not trustworthy. If there be anything certain about ourselves, it is that the average man judges righteous judgment about the one who is personally offensive to him only by summing all his manhood to the task.

In the practical work of our profession, anything less than our best is an injury. And the best of which I speak is not simply the best that we can do, but the ideal best, that best which is the product of our most conscientious and patient study and toil. We cannot excuse ourselves for poor workmanship by saying that we have done our best. That may be true as concerns present attainment, but it is not true in view of what we might do and be. Our constituency have a perfect right to expect from us not only that they shall be preserved from malpractice, but that they shall receive the most skilful treatment possible under existing knowledge and practice. This means that we must thoroughly qualify ourselves for the practice of our profession in order that we do not violate one of the fundamental principles of ethics. Many a man seems to fancy that if he keeps himself sober, honest, clean, he may be somewhat less than the best possible practitioner without blame. Ethics reaches beyond and below habits and qualities that are usually called moral. We must learn that to be incompetent is to be immoral.

Must I speak of the grave injury done to society when one of its members is corrupt? Even if there be no necessity for such a word growing out of our own moral delinquencies, yet is speech demanded by the assumption met on every hand, that our morals are nobody's business but our own. "Have I not the

right to do what I will with my own life?" is a cry not infrequently raised by those who are wasting powers of mind and body in dissipation and licentiousness. To this query the answer must be a mighty No! Were we in this world simply detached and unrelated units, the case would be far different from that which really exists. We are bound together whether we will or no. As a wise man of old once wrote, "We are members one of another." No man can injure himself without injury to others. The drunkard spoils other lives than his own; the libertine can never be alone in his debauchery. It would be no small matter—this perversion and ruin of a life—even were we not tied together as we are. To waste natural forces, to be dwarfed in character, to rob ourselves of helpfulness, to lose noble aspirations, to willingly drop from the plane of manhood to that of the beast—all this is unspeakably sad. But we are elements in a social organism, units in a great composite, and to be anything else than our highest selves is to rob society of that which it sorely needs and to which it has an inalienable right.

While we are on this subject, suffer a word as to the relation of moral character to professional success. It is true that men have won high places for themselves at the bar, as teachers, as physicians, as dentists, who have not realized in their own living the high moral standard of which I have been speaking. The community has sought their service and rewarded them generously for their professional skill. But let no man deceive himself by supposing that the success achieved is all that would have been won had they been other than they were. Whatever we may be ourselves, we do not want impurity to be brought in touch with those we love. The drunkard would keep his son from drunkenness; the lecherous man—if he have any remainder of manhood—protects his daughter from contamination by all the safeguards that he can throw around her. To the highest possible professional success character is requisite. We may go far without it, but never so far as we could with it. People are neither blind nor indifferent to immorality in those to whom they entrust the health of their loved ones. Pure women have an instinctive shrinking from an impure man, even though he hide his soul behind a fair mask. On the low ground of utility, it pays to be straight, and sober, and clean, and manly.

Possibly we may go farther and consider habits which are not distinctly within the normal categories. The uncleanly, unkempt man not only injures himself but society. For the men of our profession there are no two opposing words to be spoken about this. The close physical contact which the practice of our profession necessitates makes the personal habits of dentists a matter of first moment. No one wants a dirty finger thrust into his mouth, or a foul breath blown into his face, or an unwashed person in close contact. But there is more to it than this. By neglecting cleanliness and personal appearance, we are robbing our patients of a pleasure to which they have a right, inflicting upon them an unpleasantness that need not be, doing them an injury.

Having thus hurriedly touched upon some of the details of the negative side of ethics, we turn to the positive aspect of mutual helpfulness. Somehow, in the long, upward climb of man from barbarism, he has learned to consider and promote the welfare of others. Perhaps the better statement would be that as man has come to consider others, and because of this, he has ascended in the scale of being. Certain it is that civilization in its deeper meaning is only another name for sympathy, thoughtfulness, and mutual helpfulness. This has always been a large and important factor in the happiness of the race, but never has it been of such moment as now. Yesterday, men separated by the distance of a hundred miles were as thoroughly detached from each other as though they lived on distinct planets. Yesterday the world was large, and its different peoples knew little and cared less about each other. But now the world has shrunk and the dwellers in the utmost parts of the earth have come near together. Man is familiar with modern facilities for intercourse and we have long since not only ceased to wonder but have forgotten what they mean to civilization. They mean that, in proximity at least, all men are members of one great brotherhood. We are neighbors who a little time ago were unknown to each other. Ethics takes on an added meaning as human relations come closer, and as the telegraph, the telephone, the railway, and the steamship annihilate time and space.

Modern conditions give new force and value to ethical principles. We cannot, if we would, escape from relationships. We

are in and parts of the ceaseless process by which manhood is made or marred, by which the social order is strengthened or weakened. And each man for himself must determine what he will be, not only in and for himself but also for those to whom his life is tied, those who may be helped or harmed by that which he is and does. Never has evil been so potent and far-reaching in its influence; never has good possessed such power to bless mankind. We live next door to each other. The battle of life is being fought at short range. All life is intensified and increased in meaning.

Under such conditions as now exist, how shall a man best discharge moral obligations? The first answer, the one that leaps into all fair minds, is "by being a man." No higher eulogy can be passed upon us than that which Shakespeare puts into the mouth of Marcus Antonius:

His life was gentle; and the elements
So mixed in him, that Nature might stand up
And say to all the world, "This was a man!"

The first and largest contribution that we make to society in helpfulness is in being right. No matter what our limitations in natural or acquired ability, whether known or unknown, rich or poor, every man has the privilege of giving to his generation that which the world most needs—a sterling character. Mark you, however, this must be a reality and not a mask if it be of real value. All the world may be a stage, but we are more than players. The man who assumes to be that which he is not, so that he may accomplish selfish ends, degrades manhood and dishonors the high things to which he pretends. The Christian church has a high mission and a man may well court a right to the honored name which links the centuries together; but the man who seeks the fellowship of church life for no higher purpose than to give him standing in the community or to strengthen his professional position is less worthy of respect than the devils in hell. Mahomet, in the Koran, tells of seven hells, the lowest and most intolerable of which is for hypocrites. Whatever Mahomet's vagaries in other respects, he was evidently sound here. What is true of the church is also true of benevolent and fraternal organizations of all kinds. It is beneath manhood to use such means to boost us in our professions. Let us stand or fall on our own merits. Let us be men.

In looking about us to-day upon conditions which exist in the life of which we are a part, that which I have been saying receives constant emphasis. We find public and private greed, betrayal of sacred trusts, the prostitution of high gifts, scheming and trickery in political affairs, oppression of the weak by the strong, graft and boodle, accepted as necessary evils. Is our nation hastening to decay? Are we on the brink of governmental ruin? No—and for this reason: Back of the seen and recognized actors in governmental affairs is a great body of unknown citizens, who are honest and who demand honesty. Let no man make you believe that this is a nation of villains. The blacklegs and boodlers loom large, but they are as nothing in number compared with that inconspicuous body of moral agents which control the destinies of our country. So long as the rank and file of American voters remain true to high ideals of manhood, so long will the unfit and corrupt have their little day and then be sent into obscurity. What we need to do is to steadily increase the number of men with lofty ideals of citizenship—men who, whether on the farm or in the professions, stand like the eternal hills of righteousness. Every such man is a public benefactor. Every such man, although the great world may never know of his existence, is a priceless contribution to democracy and pure government.

When we go inward from the greater to the less, from general government to the single community, how our estimate of the importance of an honest, manly man increases! Have you ever lived in a little town where everybody knows everybody else? In such a town it may well be that you have known some man not great in anything but goodness; a man of limited means, it may be, a man of little scholarship, a man who did not have a famous name—just a plain, simple, everyday sort of man. But if that man was unselfish and honest, industrious, kind, clean, full of friendship, you know what he meant to the life of his town. How much he did that money could never have done! What impresses he left upon those growing up about him! How he enriched all simply by that which he was! And this is the high privilege bestowed upon each of us. Some of us will never achieve fame; neither will great wealth be ours. Some of us may spend our lives within narrow boundaries; but wherever we

are, it is within our power to live so well that the old world will be a more wholesome and desirable place just because we are in it.

Does this exhaust the possibilities of helpfulness? Far from it. Some of the best things in this world can be won only by fighting for them. Good ethics include warfare. Whatever may be the immorality of international wars, it is certain the time is not yet when ethical progress can be achieved without conflict. Nature is not always a safe moral teacher, but her lessons here are full of meaning. Through the long ages in which life has been developing on this planet we are told that one constant law has been in operation, that of "survival of the fittest." In the terminology of science, the most fit has been synonymous with the strongest—the victorious in battle. The fit in the ethical domain are the right. They may be strong or weak in means and physical ability, but if they would win battles they must fight. It will not do to sit still and inert, comforting ourselves with that deceptive old saw, "Truth crushed to the earth will rise again." So she will, if she has help enough, but not without it. In our profession this truth has its pertinent application. We are not to be chronic "scrappers" or seek conflict for the sake of the excitement which it brings. So far as possible we should live peaceably with all men. But when the issue is joined between right and wrong, when false standards are raised or measures proposed that hold in themselves danger for our good name and ability to render useful service, then let every manly man take arms and enlist for the war. It is only the coward who hides when great issues are at stake and the help of honest men is needed.

The life of the professional man naturally tends to narrowness. We have a certain specific task. Our work is much the same day after day, year after year. When we read we instinctively turn to that which will inform us and strengthen us in the work which we have to do. And this is legitimate and praiseworthy; the man who is not ever learning soon drops behind. We owe it to our patrons not only to secure thorough preparation for our work, but to keep abreast of the ever-growing knowledge in our profession. But the danger is that we shall become men of one idea. This is the danger of all specialism. In a sense we may and must be just that; in another sense we should be all-around men.

We are men before we are dentists, and manhood's obligations should never be forgotten or ignored, whatever may come to us of strenuous professional toil or of high achievement. Life is more than knowledge, more than compassing our professional aims. Its values lie chiefly in things that cannot be measured by the money we earn or the fame we win. Friendships, unselfish friendships, affection binding us together, these are things best worth while in life. Missing them, we miss the perfect joy of living.

And we have a duty to society that cannot be executed except through our conscious and earnest discharge of social obligations. I do not now mean "social" in the sense of functions, dress parades, etc., although that side of life has its value. By social obligations I mean obligations to our community life, obligations of good citizenship. The life of the community will depend upon the attitude of its members toward it. Some of the most serious dangers that threaten us, some of the most potent evils from which we suffer, find their explanation in the indifference of the better classes. Does it make any difference whether the city administration be in the hands of honest or dishonest men? Does it make any difference whether the streets are kept clean, garbage collected, sanitation looked after, the water supply kept pure? Surely there can be but one answer to these questions. But how are these desirable ends to be gained? Certainly not by the withdrawal of good men from all interest in such matters. Who are we that we should refuse to do our part in making the conditions under which we live such as they should be? What right have we to call ourselves devotees of a high ethical standard, when we refuse to have any part or lot in applied ethics as found in the administration under which we live? "No time" is the plea of selfishness, and we ought to be ashamed to make it. What we mean by it really is that we are not willing to turn aside from congenial and remunerative professional work to do our part in securing the interests of society. But if ethics has any practical bearing upon life anywhere, it is at just this point.

As a profession, we have our codes and ethics, fundamental, clean, unmistakable. We know what is expected of us in our relations with our patients and with each other. No one will urge the plea of ignorance in attempting to justify himself for un-

professional conduct. Because all this is so well known, I have not taken time to repeat it in this paper. It has been my purpose rather to look further afield, to take a broader view of ethics than that which is included in any formulated enactment. As we stand to-day upon the summit of the years and look back along the way our profession has journeyed, we have every reason to rejoice and take courage. Not only has our practice been lifted up into an assured and honorable position, but the members of our profession have constantly enlarged their ideals of life. We have a right to pride ourselves upon the large and honorable place which we occupy in the world's life. To be permitted to minister so largely as we do to the welfare and happiness of our fellows, to be able to relieve pain, restore and preserve health, make trying physical conditions more tolerable, is something for which to be profoundly grateful. And we all know that our profession is still in its infancy. Great as is the progress that has been made, the coming years will witness greater. We have not come to the place where discovery is exhausted, and nothing remains but to pursue the well known. Each year adds to the knowledge and skill of our members. Each year marks a distinct advance.

Shall we content ourselves with growth in technical knowledge? Rather let us court and seek for progress in all that enters into the ideal member of society. Man has not yet reached the perfection of manhood. Society is not yet ideal. Even we as individuals know that we are not all that we may be.

"Unless above himself he can
Erect himself, how poor a thing is man!"

Unless we can slough off the imperfect for the increasing perfect, not only in professional methods, but much more in qualities or character, we shall fail of getting the highest meaning out of these lives of ours. The failure, if such there be for any of us, will not be from lack of knowledge, from ignorance of that which is true, from absence of clear call to the heights of life, but from our own choice, from which we take to ourselves the lower rather than the higher. To every man comes the vision of noble manhood. Clear and alluring stand out the heights which the world's great souls walk. The way to these may be long and rugged, but it is distinct and may not be mistaken.

With ourselves lie the issues of life. We know that we have the power to be clean, honest, true, unselfish, altruistic; such men as every generation needs, such men as in any and every age brighten and bless the world. But to see the vision is not enough; the men who win are not only those who see the gleam, but who follow it. Baboushka, so a Russian legend says, was working in her cottage when the three wise men passed by on their way to find the new-born King. "Come with us, Baboushka," they cried, "and we shall lead you to the King." "Not so," she answered, "for my tasks are not yet done. Go you on, and later I will follow." But when the tasks were ended, the wise men had disappeared, and she could not find the way. And ever since on Christmas eve, she comes to the people's homes in search of Him whom she might have known but for her fatal postponement.

When the gleam of duty shines before us, when we may make the world a better home for man by our service, when manhood and righteousness may be exalted through our loyalty, may we halt not nor hesitate in "following the gleam!"—*Dental Cosmos*.

PORCELAIN. By D. O. M. Le Cron, M.D., D.D.S., St. Louis, Mo. Porcelain is a material in which the beauty of the results well repays the highest exercise of art. In the hands of a skilful operator, the natural organs can be imitated by it so closely that it is almost indistinguishable. In this branch of our profession many failures have been experienced, and many of the fraternity gave it up with disgust—due, we may say, to lack of confidence and ambition to make further investigation. No one can become skilful in and master porcelain until he becomes familiar with all the details connected with its composition and manipulation. Experience alone is our best teacher. To be successful in any walk of life, let it be mechanics, engineering, trade, or the professions, we must turn about-face, cut off all the avenues of failure, and have sufficient self-confidence to boldly face all emergencies that may arise.

We must have some definite purpose in view and persistently strive to meet it by thought and action. Any success worthy of attainment costs constant effort and is gained only by hard work and self-confidence.

Marden says: "How long would it take a young man to become successful who puts himself into an atmosphere of failure and remains in it until he is saturated with the idea? How long would it take a man who depreciates himself, talks of failure, thinks of failure, and walks like failure—who is always complaining of the insurmountable difficulties in his way, and whose every step is on the road to failure—how long would it take him to arrive at the successful goal? Would anyone believe in him or expect him to succeed?"

The majority of operators who meet with failure in this field begin by doubting or depreciating themselves, or by losing confidence in their own ability. The moment we harbor doubt and begin to lose faith in ourselves we capitulate to the enemy. Every time we acknowledge weakness, inefficiency, or lack of ability, we weaken our self-confidence, and that is to undermine the very foundation of all achievement.

The pioneers of modern porcelain work had crude appliances and materials at their command compared with what we have to-day. They were men who thought and experimented, and we may rest assured they met with many failures. Those who had the perseverance and indomitable will to surmount the many difficulties, in time reached the goal.

My many failures in this line of work instilled in me that desire to make investigations, in order to learn the cause and how to overcome them.

During the last sixteen years I have devoted much time to this class of work, experimenting with the different porcelain bodies and furnaces that were put on the market from time to time. To reach the highest point of success and be master of the situation, we must learn to manipulate the porcelain so that it will retain its form; calculate on the shrinkage to maintain its outline; ascertain the true fusion by experimenting; secure a thorough knowledge of the furnace; and, last, but not least, teach the eye to blend the colors properly. This can only be accomplished by repeated experiments and a determined effort on our part to master the situation. All can learn the ceramic art who have the perseverance and the ambition to attain the front rank of the profession.

Two years ago I prepared a paper on the fusion, crushing

strength, and shrinkage of the different porcelain bodies on the market, and gave the results I obtained after three years of experimentation.

Since the foregoing date my son, Dr. Robert Le Cron, and I have made further investigations along the same line and found the results corresponded accurately with my former experiments. In our opinion the fusion of porcelain is to be considered of supreme importance and is the greatest factor to be dealt with in the final results. Our experiments convince us that a more uniform and greater crushing strength is produced in porcelains when fused at their normal fusion, the exact colors under such conditions being reproduced as they were intended to be.

It is true that temperatures can be judged by the color of the furnace, and fusion of porcelain can be approximately ascertained by an experienced eye within 50 to 200 degrees Fahrenheit. Much depends, however, upon the susceptibility of the eye of the observer to light; also the degree of illumination under which the observation is made. It will be observed with a thermoelectric pyrometer that in bright daylight we will first notice the dark red heat appear in the furnace at 1,075 degrees to 1,100 degrees F., and the dull orange heat at 2,025 degrees to 2,050 degrees F. In a dark room at night a furnace will indicate the same colors—the dark red heat at 750 degrees F., and the dull orange heat at 1,750 degrees F.

Because of this fact and its serious consequences, and having determined the crushing strength, the shrinkage, and the fusing-points of the different porcelain bodies, we commenced a series of experiments with pure gold and platinum combined in different definite proportions until pellets of a given size were obtained which fused at the respective temperatures required for the fusion of the different porcelain bodies.

With this metal in proper proportion and a soapstone crucible so constructed we have a pyrometer with which we are able to properly fuse any of the porcelain bodies without the danger of overbaking, no matter how the current varies or how irregular the heat may be. It is very important, however, that the metal be placed side by side with the work, so that the same relative heat shall absolutely reach the two, to assure perfect fusion. We must also be governed by the bulk of the porcelain to be fused.

For all large pieces of work it is a good idea, when the melting-point of the metal is reached, to turn the back rheostat handle one button and hold it there for from ten to thirty seconds, according to the bulk of porcelain, so that it may become thoroughly fused. If this method be carried out in all its details, it furnishes the most simple and inexpensive means of obtaining correct results.

The melting-points of pure gold and platinum cannot be expressed accurately numerically, nevertheless a scale may be arranged from them.

We found with a mixture of pure gold and platinum that for every five per cent more of platinum the temperature is raised about 105 degrees Fahrenheit.

The determinations, however, became uncertain with more than 25 per cent of platinum, as it requires a heat above 2,500 degrees F. to fuse the pellet. The temperature corresponding to the melting-point of an alloy, say of 85 per cent of pure gold and 15 per cent of platinum, would represent a degree of heat of 2,330 degrees F.

On account of the durability of the alloys this method of measuring temperature is not expensive, and I assure you it will meet our requirements.

We will next take the composition of a few of the porcelain bodies, giving the results of the investigations we made.

Professor Seger says: "Even if nature does not grant to the human eye a look into her most secret workshops, if she does not show how she changes clay into shale, sand into sandstone, or forms a crystalline lime or marble out of the deposits of calcareous shells; if she has not, up to this time, permitted us to determine the conditions under which, in heaps of detritus formed by friction and weathering, the like constituents move to certain centers of concentration and become new crystalline formations; yet speculative science, by a comparison of the products upon which these unknown influences have worked for an unlike duration of time, or with unequal intensity, furnishes a hold as to how these may have originated and brings us closer to the workshop of nature—for the most part not accessible for direct observation."

However valuable the data which the physical investigations

of clays offer in regard to their behavior in the plastic condition in soft burning, or the chemical analysis for the recognition of the constituents which prove harmful in the manufacture, as in the investigations of Bischof for the judging of the degree of fusibility, nevertheless these investigations do not yet suffice in all cases for characterizing sharply the nature of a porcelain, and it happens often that the scientific results and the discoveries of practice deviate more or less from one another.

The cause of this is found in that fact that the chemical and physical analyses allow only a few mutual relations to be seen and do not give information concerning all conditions. The physical analysis teaches us to know the relation between the porcelain substance and the mineral fragments, and explains a series of phenomena that are more or less independent of the chemical composition. The chemical analysis gives us hardly any information concerning physical properties, and for the behavior in high temperatures conclusions are only possible under the supposition that all substances indicated by the chemical analysis can enter into it.

The chemical analysis of the porcelain we are using may be of some interest to the profession. At least, we were so much interested in its composition and action under heat that we had four of the different porcelain compounds analyzed, and herewith I give the percentage results:

	No. 1	No. 2	No. 3	No. 4
Silica	66.95	77.52	71.10	68.86
Alumina	16.70	11.25	12.3	1.87
Lime	2.10	1.42	2.13	1.70
Magnesia	0.30	0.30	0.30	0.30
Alkalies	12.35	8.39	10.64	25.59
Tin oxid	Trace	1.30
Loss on ignition.....	1.60	1.12	1.48	0.38

The research we have made from the great publications of Professors Seger, Brogniart, Bischof, Richters and others, on the study of the physical properties and the relation of these to the chemical composition leads us to conclude, as regards the character and action, when found, of the above four porcelain bodies, approximately as follows:

No. 1: As reported this consists of approximately 96.50 per cent of the feldspar albite, and 3.50 per cent of hydrated calcium

oxid—slaked lime. (Albite is a feldspar, usually of a white color, containing soda instead of potash.) The feldspar alone fuses at a high temperature to a white glass. The addition of the small percentage of lime would make the mixture more fusible and also more opaque.

There would be no chemical action in fusing the feldspar, and the lime would chemically combine with the silica upon fusing, forming a silicate of lime.

No. 2 consists of approximately 75.50 per cent of the feldspar albite, 25 per cent free silica, and about 2.50 per cent of hydrated calcium oxid. The free silica and lime would combine with the feldspar chemically upon fusion, the whole fused mass becoming a silicate.

No. 3: This is composed in all probability of approximately 64 per cent of orthoclase feldspar, 33 per cent of free silica and 3 per cent of hydrated calcium oxid. (Orthoclase is a potash feldspar.)

In fusion the free silica and lime would chemically combine with the feldspar, making the entire fused mass a silicate high in silica of the composition as given in the certificate of analysis.

No. 4: This as reported consists of a mechanical mixture of caustic alkali (mostly potash), silica, hydrated calcium oxid and tin oxid, which have been fused together and ground up. When these ingredients are fused together they combine chemically and the resultant fused mass becomes a silicate of potash, lime and tin. In the present state there should be no further chemical action upon the fusion, as it would simply result in a remelting of the already fused material which has been powdered.

It has an approximate composition of 70 per cent silica, 25 per cent alkalis, 2 per cent alumina, 2 per cent lime and 1 per cent tin oxid, all combined together chemically due to the first fusion as silicates. In all the porcelain samples analyzed, the alkalis alone would make a transparent glass, while the alumina and lime make an opaque-like enamel. According to Brogniart's reports on fusibility of porcelain, the higher the percentage of silica the less fusible is the mixture. The higher the percentage of alkalis the more fusible becomes the mixture. The higher the percentage of lime the more fusible becomes the mixture until the proportion of lime present becomes greater than the silica.

When the proportion of lime present is higher than that of the silica, the mixture becomes less fusible.

The alumina, if not present in too large quantities, would make the mixture more fusible than if silica were in its place, but it does not affect the fusibility to any large degree.

It is evident that the metallic oxids, provided they are pure, produce definite colors, and they are used in ceramic art as follows:

Cobalt oxid, for all shades of blue.

Nickel oxid, for brown.

Copper oxid, for green.

Manganese oxid, for brown and violet

Iron oxid, for brown, yellow, or red.

Uranium oxid, for yellow.

Chromium oxid, for green or red.

The noble metals, gold, platinum, and the oxid of iridium for red, gray, and black, respectively.

Remsen says: "We have learned that there is a close relation between the different kinds of physical change and chemical change, and that one kind of change is capable of producing other kinds. We have learned how to distinguish chemical action from other kinds of action, the loss of their own properties which action. And, finally, we have learned that the name 'chemical upon one another, but that we do not know what chemical affinity affinity' is given to that which causes substances to act chemically the substances suffer being a prominent characteristic of chemical is—we only know what effect it produces."—*Dental Cosmos*.

DENTAL CARIES CAUSING FUNCTIONAL AND ORGANIC DISEASES. By Percival E. Loder, M.D., D.D.S., Philadelphia, Pa. The above title does not altogether cover the scope of this paper. The title should be "Dental caries and other diseases of the buccal cavity causing sympathetic function disturbances which may lead to organic changes as well as infection leading to lymphatic involvement."

At first thought this may seem much too large a subject to be discussed in the short time that is usually allotted for a paper to be read before a scientific body such as has gathered here to-night, but I hope to condense it as much as possible, yet bring out some facts about diseases of the body due to buccal irritation which

often receive but little attention by those that are in position to know more about them.

It is not my purpose to dip deeply into the pathology of the various diseases to be referred to, but rather to go over them in a general way and point out how they are caused by dental or buccal irritation, and give a few cases to prove their connection with trifacial disturbances and show how by the removal of the causes the disease will be cured if the disturbance has not gone on long enough to produce organic changes.

I will try and confine my remarks to diseases that are of interest to the dental profession, as the dentist must help the physician cure the patient, thereby showing how intimately the two professions are connected and how much each is dependent on the other, and how important it is for the dentist to know more about medicine and how still more important it is for the physician to know something about dentistry, as these patients usually go to the medical man first, and the only exploration he makes of the buccal cavity is a casual look at the tongue.

To-night we wish only to speak of diseases arising from irritation to those filaments of the trifacial nerve that come from the second and third division, and are distributed to the teeth and buccal cavity. The greater part of these nerve affections are due to direct irritation of an exposed pulp or nerves in the roots of teeth not entirely devitalized. The irritation may be due to particles of food decomposing in the cavity caused by decay of the tooth, or may arise from drinking liquids either too warm or too cold, etc.

The sudden application of extreme cold to the teeth, even if there is no caries, may produce reflex nervous disturbances. We often see severe irritation kept up by the retention of a part of a tooth that is entirely devitalized. In this case the filaments supplying the surrounding tissues are irritated and usually there is a breach in the continuity of the mucus and gingival tissue which opens the way for the absorption of pathological germs which produce lymphatic involvement, this being often followed by supuration of the lymphatic glands of the neck, thus marring the beauty of many a youth.

There is no doubt that a carious condition of the teeth, a devitalized pulp, a diseased condition of the soft tissues, or fragments

of the deciduous teeth remaining attached to the gums after the permanent teeth are erupted, are a great and constant source of irritation that may produce nervous disease, such as neuralgia of the head and face, and often of more remote parts of the body. The same condition of the teeth may, through the sympathetic nervous system, produce functional disturbances of the eyes and ears, and, if the irritation is not removed, will lead frequently to very obstinate inflammatory troubles of these organs.

A case of sympathetic meningitis has been reported which proved fatal, the cause of which was a dental exostosis. Reflex nervous affections, as paralysis, especially paralysis of the muscles of expression, tetanus, chorea, epilepsy, etc., are also often to be seen. It should not be forgotten that reflex nervous troubles occur, due to caries, when the teeth are not painful.

It is difficult to understand how the different nerve troubles, as hyperesthesia, anesthesia, spasms, paralysis, etc., will arise from apparently the same cause. The mental faculties also are occasionally disturbed by irritation from this source. This is well illustrated in the case of a boy, aged nineteen, who was admitted to the New Hampshire Asylum with acute mania. On investigation it was found that the lad had been in good health a few days previous to admission, but having had a tooth extracted, which was broken during the operation, a small part of the root was left in the jaw. This began suppurating and caused such irritation as to produce mania. After the extraction of the fragment of root the patient rapidly recovered.

In case of a diseased condition of a tooth, whether a simple cavity, with or without exposure of the pulp, or one wholly devitalized, there is not much probability of any nervous trouble developing after it is properly treated and filled with some non-irritating material. This, however, is denied by some writers, who claim that any tooth, after being filled, no matter how carefully, will produce nervous disease. But these writers are certainly in error.

If we study carefully the nervous distribution and connection of the trifacial with some of the other cranial nerves through the sympathetic system, we will be better able to appreciate the sympathetic affections of the eyes and ears so frequently occurring where there are decayed teeth, especially in children. Such cases

are frequently very obstinate in yielding to treatment, unless the diseased teeth are either removed or treated.

In studying the nervous diseases due to the irritation of the branches of the second and third divisions of the trifacial nerve, it will be well to consider them under three divisions: First, altered sensibility, as neuralgia and anesthesia; second, sympathetic functional disturbances, which lead on to organic changes by first producing congestion, which is followed by inflammation, as those of the eyes and ears, etc.; third, those due to reflex action, as epilepsy, chorea, paralysis, etc.

Neuralgia or nerve pain has many causes. Predisposition is a very prominent factor in neuralgia. Anything that has a tendency to depress the system will predispose to this disease, such as anemia, rheumatism, gout, excessive venery, syphilis and malaria. If there is no predisposition there is but little danger of neuralgia from dental caries, as we have all seen cases where there was not a whole tooth in the mouth, yet the patient did not complain of neuralgia.

The principal exciting cause of neuralgia of the fifth nerve is undoubtedly a diseased condition of the teeth. Neuralgia caused by dental irritation is not always limited to the trifacial nerve, nor is dental irritation always the cause of trifacial neuralgia.

Frequently we have neuralgia of the fifth nerve due to a rheumatic affection of the sheath of the nerve, or to inflammation of the nerve or of some of its branches. As branches of this nerve pass through the small bony canals, such as the infraorbital, anterior, and posterior dental, there may be pressure on the nerves in these channels, due either to tumefaction of the nerve or to a contraction of the canal, in consequence of periostitis. This pressure will produce great neuralgic pain by interfering with the transmission of the nervous current.

The conditions of the teeth that will act as irritants are many: acute and chronic inflammation of the pulp, exostosis, or increase of cement at the extremity of the root, thus encroaching upon the entrance of the nerve, are very common causes. Sensitive dentin, where there is but little decay and the pulp is not exposed, chronic inflammation, and thickening of the periosteal covering of the roots of the tooth, abnormal position of the teeth, teeth which remain imbedded in the jaw, are often the cause of severe neuralgia. The

third molars are the more frequent to be thus imbedded. This cause of neuralgia is most frequently overlooked. Crowding of the teeth will occasion nervous trouble, as also will tumors of the jaw by pressing on the dental pulp; foreign bodies in the pulp cavity, as particles of toothpicks, berry seeds, broken broaches, etc., injuries produced by extraction of the teeth, whether successful or not, by injuring the soft tissues, small portions of tooth tissue remaining attached to the gums after extraction, etc., will cause nervous trouble.

It is well known that pain is not always felt at the point of injury or irritation, but is often reflected to distant parts of the body, thus accounting for the neuralgias which are felt in the extremities and in the internal organs. These neuralgias are often cured by the treatment or extraction of a carious tooth. On the other hand, we will often have toothache when the teeth are perfectly sound, due to some disease in the ears, eyes, or some other remote part of the body.

There is evidently great sympathy between the teeth and the uterus. Anstie mentions a peculiar case in which uterine neuralgia was immediately relieved by the extraction of a carious tooth. It is very common to see toothache in apparently sound teeth during pregnancy. This is probably due to reflection of pain from the uterus. If there is any caries at all, the patient is most certain to suffer more or less during gestation. At times there is so much suffering that it is necessary to treat the teeth or remove them during this period. Usually teeth are allowed to take care of themselves during gestation, but this is a mistake. There is no reason for not attending to the teeth at this period, except possibly in some highly nervous women. Even in these cases it would be well to give them some attention. Teeth can be filled and extracted, if necessary, without any evil results following, if it is carefully done. The writer has extracted teeth during every month of gestation without any unpleasant symptoms arising.

For further proof that neuralgia is often the result of caries or irritation to branches of the second and third division of the tri-facial, I will give abstracts of a few reported cases which were cured by extraction of decayed or diseased teeth. In the *Dental Cosmos*, vol. ii, page 507, a case is reported, the subject being a highly nervous woman, who was suffering from neuralgia and

deafness due to a wisdom tooth which was slightly painful to the touch, complete cure following the extraction of the tooth. In the same journal (vol. iv, page 103) an account is given of a severe case of sciatica which would not yield to any medical treatment, but was cured by the removal of a number of decayed teeth. Two cases have been reported by Samuel A. Parker, Esq. The first, a case of periodical neuralgia affecting the face, ear, and temple; the root of the tongue was the seat of violent pain, the paroxysms of pain continuing from six to eight hours. This periodical pain for a long time resisted all medical treatment. It was completely cured by the extraction of the left lower molar; this was found to be decayed and the gum of the surrounding tissues being much inflamed. The second case was that of a young lady who complained of severe neuralgic pain in the temples and inability to sleep. A number of teeth were found decayed and broken off to the gum, but the patient never had toothache or any soreness about the gums. Removal of the stumps cured the neuralgia.

A case of severe neuralgia due to a fibrous growth of new formation among the peripheral nerves has been reported, which was cured by the extirpation of the nerve. A number of cases of neuralgia following extraction of diseased teeth are on record; these were probably due to injury to the nerve filament, or to irritation resulting from a small part of the root remaining in the socket.

Anesthesia or paralysis of sensation as well as paralysis of the special senses, as sight, hearing, taste and smell, have been recorded and reported cured by the treatment of or the removal of a decayed tooth.

Dental irritation will also cause paralysis of the motor nerves, thus in a case of a diseased molar there was paralysis of the facial muscles due to long continued irritation to the trifacial nerve which continued long enough to produce organic changes in the facial nerves and thereby causing a permanent paralysis of the muscles of expression.

Sympathetic inflammation of the eyes and ears due to dental irritation are common and were recognized by Richter as far back as 1795. Through the constant reflexed nerve irritation the nutrition of the parts is interfered with, the vitality of the parts lowered, a paralysis of the capillaries produces pathological conges-

tion, the normal resisting power is lost, an invasion of bacteria takes place which may and has been followed by destructive inflammation of eyes and ears.

Richter mentions the case of a lady who was nearly blind for a period of several years, a complete restoration of vision being obtained, after all other treatments failed, by the extraction of a carious tooth, which had troubled her for a number of years. Beer in 1817 mentions a case of contracted field which was entirely relieved by the extraction of a carious tooth. Mr. Jonathan Hutchinson, of London, was the first to write a systematic paper on the subject, calling it to the attention of eye surgeons in a paper entitled "A Group of Cases Illustrating the Occasional Connection Between Neuralgia of the Dental Nerves and Amaurosis." (Oph. Hosp. Rept., vol. iv, 1865.) In this paper he states his belief that many cases of contracted vision in infancy are caused by irritation of the fifth nerve consequent upon dentition. Somewhat later Wicker, of Berlin, confirmed these views and gave a collection of cases. Alexander, of Aix-la-Chapelle, gives the history of a patient who suffered with amblyopia. Examination with the ophthalmoscope gave negative results and entirely failed to reveal the cause. On questioning closely, he found the patient suffered greatly at times from severe toothache. An examination of the teeth revealed a carious upper molar; this being extracted, the vision became normal in two days. Schmidt, of Berlin, wrote an exhaustive article on "The Reaction of the Power of Accommodation, the Result of Toothache." He examined the vision and eye ground of ninety-two patients who were attending the clinic of Professor Albrecht for carious teeth; only nineteen were found to have normal vision and in some the loss was very marked. The following is a collection of cases seen and reported by a number of professional men, not only dentists, but practitioners of medicine and eye and ear specialists.

In a case reported by Dr. McClure, J. C. H., aged twenty-two, sought advice for failing vision in the left eye. He first noticed impairment of sight five years previously. He could not read with the left eye. Right eye normal. The ophthalmoscopic examination revealed nothing that would account for the loss of vision. On questioning the patient, it was found that he had suffered with toothache for some time. The teeth were examined

and the left bicuspid, which had been filled some time before, was found very sensitive, and with a feeling of elongation. The patient was recommended to have the tooth extracted, which advice was complied with. The result was most happy. The patient returned in a few days with normal vision.

Many more cases are on record, but these cases are sufficient to show that some eye troubles are due directly to dental irritation.

Simple neuralgia of the dental nerves may cause a disturbance of vision where there is no pathological condition of the teeth existing. The following case will illustrate this condition:

Fred. W. K., aged thirty-seven, complained of severe neuralgia of the dental nerves of several days' continuance. Since the neuralgia seizure the vision has become very dim; before the attack it was perfect. On testing the vision, large letters only could be seen. Ophthalmoscopic examination revealed nothing abnormal in the eye ground. The teeth on examination proved perfectly sound and in good condition. He was given treatment for the neuralgia, and under it he recovered in a few days. The vision became normal as soon as the pain was relieved.

The opposite condition is illustrated in the following case, reported by Mr. Jonathan Hutchinson. The patient, a young man, was suffering with acute ulceration of the cornea, accompanied with hypopyon chemosis and much pain. He complained that the eye made his teeth and ear ache. The teeth were examined and found in a good condition. Here is an instance where the pain certainly began in the periphery of a sensory nerve and induced pain in two distinct and somewhat distant parts.

Crowding of the teeth without pathological change may cause loss of vision. The following case is taken from the *London Lancet* of 1859, page 80. The patient, a boy, woke up one morning unable to see objects clearly—practically blind. He was taken to a hospital, where a thorough examination was made of the eye ground, but no cause could be found until the mouth was examined and a great crowding of the teeth discovered. Thinking this might be the cause of the blindness, three molars were extracted to give more space for the remaining teeth and to remove the pressure. A marked improvement was shortly noticed and in the course of a few days the vision had become normal.

Dental irritation is often the cause, or, when already existing,

will aggravate an inflammation of the eye. This is not hard to understand, knowing the intimate nerve connection existing between the teeth, eyes, and ears. Where continued irritation of the nerve filaments exists, a disturbance of the vasomotor nerves will follow, and a consequent dilatation of the capillaries, which in turn would lead to congestion and inflammation. This is well illustrated by the following cases:

A lady, aged twenty-five, had circumscribed scleritis of the right eye. The general health was good. No cause could be found for the inflammation until it was discovered that she had a troublesome tooth—the second upper molar of the same side as the affected eye. The general treatment pursued in like cases produced no perceptible good. The tooth was extracted, and the inflammation began to subside as if by magic.

The ear is as liable to disturbances caused by dental irritation as the eye. Children during dentition are subject to severe neuralgic attacks, and during this period they are also very liable to severe inflammation of the middle ear, which in many instances, if not the immediate, is at least a predisposing cause of inflammation, which, if allowed to run its course, often results in complete destruction of the hearing.

Sexton, of New York, who examined the teeth and ears of the inmates of a large charitable institution, they being almost exclusively within the age of second dentition, found that over six per cent were suffering from otitis media purulenta. In thirty children there were frequent attacks of earache; in some cases there occurred earache and toothache at the same time. In many cases where inflammation cannot be directly traced to dental irritation as its cause it is certainly aggravated by the latter, and a cure is seemingly impossible until the dental irritation is removed. Children who are undergoing treatment for otitis media are almost sure to have a recurrence of the discharge and even some renewal of the inflammatory symptoms during the eruption of a tooth. After the irritation caused by the tooth has subsided the treatment will again progress favorably.

The following case shows the necessity of examining the mouths of children subject to aural trouble: The patient, a child, had been suffering for some time with earache. The cause was not apparent until the mouth was thoroughly examined. A fragment

of enamel was discovered which had been left behind from one of the deciduous teeth. This was wedged in the gum alongside of a newly erupted molar. The membrana tympani was decidedly inflamed. The removal of the fragment cured the neuralgia and the membrana tympani returned to its natural appearance.

The eruption of the third molar or so-called wisdom tooth is very frequently the cause of grave aural disease. If the ear be already affected with the disease when the eruption of the teeth begins, this will aggravate the already existing trouble.

We not only have inflammatory conditions produced by dental irritation or pre-existing pathological changes aggravated by the same, but will also have paralysis of the auditory nerve or deafness, which the following case will illustrate:

Rosa —, aged fifteen years, complained of severe pain in the left ear and side of face, accompanied with almost complete deafness. These symptoms would last for several days and then subside. She said that when her tooth ached the pain and deafness began to trouble her. Thinking the case of the aural trouble might be a carious tooth, the mouth was examined. A carious upper molar of the right side was found with the pulp exposed and very sensitive. Extraction was recommended. After the tooth was removed the pain and deafness entirely disappeared.

Catarrhal condition of the nose, if not caused by dental trouble, will be much aggravated by a pathological condition of the teeth; if the teeth are treated the inflammation of the Schneiderian mucous membrane will be much relieved, if not entirely cured.

Muscular spasm, such as we see in convulsions, epilepsy, chorea and tetanus, can often be traced directly to dental irritation. When the above conditions are due to such disturbances we have reflex neurosis to deal with, and not a disease of the central nervous system, or of a poison in the blood acting on the nerves or nerve centers.

Constant irritation to the periphery of any sensory nerve may be reflexed to the motor nerves and cause muscular spasm, but here we are interested only in the pathological condition of the periphery of some of the branches of the second and third divisions of the fifth nerve. Tetanus or lockjaw is due to a specific germ known as the tetanus bacillus, which causes a spasmodic or a continuous contraction of certain groups of muscles or general mus-

cular spasm. If this action is confined to the muscles of mastication it is called trismus. The tetanus we wish to deal with is reflexed, due to trifacial disturbance and not due to the tetanus bacillus.

The late Professor Gross refers to a case (in his System of Surgery) in which a young lady, seventeen years of age, had an attack of tetanus, without trismus. In her case the paroxysms occurred very frequently, at intervals of five to ten minutes during the first twenty-four hours. It was produced by a severe irritation in the upper jaw arising from a diseased condition of a canine tooth. There are some cases reported following the extraction of a tooth, which was again placed into its original position, with the idea of having it unite again.

This experiment, I may say here, is rather a hazardous one, although it has been done very successfully. I have had a man under observation for the past seventeen years who was subjected to this experiment without any evil symptoms developing during this period. D'Obbelin cites a case where tetanus occurred simultaneously with the extraction of a tooth. A case has been reported from the interior of the state where a young man had three teeth extracted, which was followed by tetanus. A case has been reported by Dr. W. H. Howard, in which tetanic symptoms appeared, due to a piece of barbed broach, that was broken off in the root and a filling placed on top of it.

The *Dental Cosmos*, vol. iv, page 305, gives a case of a boy aged fourteen who died of lockjaw arising from continued irritation of decayed teeth. Henry Hancock, Esq., I. K. C. S., surgeon to the Charing Cross Hospital, reported two cases of chronic muscular spasm. First, a gentleman, aged thirty, had lockjaw for nearly twelve months; he could only separate his jaws for about half an inch. Extraction of an anterior upper molar resulted in a perfect cure. Second, a young lady with spasms of the muscles of the neck, producing what is commonly called "wry-neck," which had existed for six months, was cured in a few days by the extraction of a stump and partially decayed tooth from the lower jaw on the left side.

Tetanus and death following the extraction of a tooth and filling of another tooth have been reported; a part of the gold pene-

trated the floor of the cavity of the tooth projecting into the soft tissue between the roots.

The trismus that usually accompanies tetanus, produced by a diseased condition of the teeth, will prevent any interference with these organs until the spasm is somewhat broken, and as soon as the diseased organ can be reached it should be removed. The following are the notes of a case that came under my observation some years ago, the patient having the second attack within thirteen months from the same cause:

P. V., aged thirty-five years, nativity Polish, occupation interpreter, generally enjoyed good health. He had primary syphilis three years ago. The writer was called to see him in January, 1884, at which time the following history was elicited. About three months previous to the first visit he experienced a slight irritation in one of the right upper molars. This annoyed him for several days, after which he went to a dentist to have it extracted. The dentist was unsuccessful in his effort to extract it, at the first attempt, and the patient, suffering a great deal of pain, would not allow the dentist to try again, but went home thinking the pain would soon cease. The pain did lessen during the following twenty-four hours, but forty-eight hours after the unsuccessful attempt to extract the tooth, the patient noticed a slight twitching of the left arm. This wore off in the course of a few weeks, growing less daily, although after a number of weeks he would experience a spasmodic contraction of the arm if under any nervous strain. The night previous to my first visit he had been exposed in a cold rain. At the first examination he had a slight fever and great pain (which he located in the precordial region), with great muscular spasm of the muscles of the upper and lower extremities at intervals of about twenty minutes. During the muscular spasm the patient suffered excruciating pain. There was also some stiffness of the muscles of the back, which was remittent in its character, never passing off entirely, but was aggravated during the paroxysm. By the administration of large doses of morphia. hypodermically, to stop the paroxysm, followed by large doses of potassium bromid and chloral hydrate, he recovered after an illness of about two weeks. As soon as the muscles were relaxed the tooth was removed without any trouble, and without any evil results following the extraction.

One year after this first attack I was again sent for, and found the patient suffering from fully developed tetanus. The paroxysms of muscular spasm followed each other at short intervals. Again the patient stated that he had had some irritation in an upper molar for several days previous to this attack, and the night before was exposed to extreme cold. Some twelve hours after this exposure the tetanic symptoms appeared. One grain of sulphate of morphia hypodermically, at one dose, relieved the pain and lessened the paroxysm very decidedly. As the usual dose of morphia hypodermically is gr. $\frac{1}{8}$ to gr. 1-6, the one-grain injection may seem like a homicidal dose, but the experience that the writer had a year previous with this patient warranted him in using so large a dose. The after-treatment consisted of administration of chloral hydrate, bromid of potassium and tonics. From the second attack the patient recovered more rapidly than from the first. The tooth being removed as soon as the jaws could be separated, the period of convalescence was not over a week. Since then he has not had any trouble. In both instances the pulps of the teeth were exposed. This, with exposure to cold and dampness, undoubtedly acted as the exciting cause.

Chorea or St. Vitus's dance is another form of spasmodic muscular contraction which may be due to dental caries or to dentition, both first and second, which is generally overlooked.

Eulenburg states that he has, on several occasions, found the disease, when due to dental disorders, disappear after the extraction of the carious teeth and again make its appearance upon the development of fresh trouble in the teeth. Reynold's "System of Medicine," of 1868, says, "Sometimes a special cause of irritation can be discovered, as worms or carious teeth." Condie on Diseases of Children mentions, as one of the exciting causes, difficult dentition. Dr. J. J. Levick says, in a paper on chorea: "Irritation connected with the teeth would seem to have more to do with the development of chorea than we would at first suspect." Monroe, the younger, used to state in his lectures that he had several times noticed the disease develop during second dentition, while the first were still attached; which would be cured by the removal of the deciduous teeth. A very large proportion of cases of chorea occur during the time of second dentition, when children suffer so much with toothache, of course, the greater part of this toothache

is due to exposed pulps. Under such circumstances we have a constant irritation. If physicians would bear in mind that such irritation is capable of producing such neuroses as tetanus, epilepsy, neuralgia in different parts of the body, sympathetic disorders in the ears and eyes, etc., and if physicians were to look more carefully after the teeth in this disease (chorea), it is probable we would find many more cases of chorea reported as being caused by a diseased condition of the dental organs; and it would be seen that the extraction of the diseased organs would cut short what is usually a long, tedious illness.

Epilepsy is another disease that may be caused by reflex buccal irritation, as the following will show:

A case has been reported in which the wearing of a metallic plate produced such irritation as to cause epileptic convulsions, with paralysis of the face and tongue. This case was entirely cured by substituting a rubber plate for the metal one. A number of cases have been reported where the epileptic seizures were undoubtedly due to irritation to the terminal filaments of the dental nerves. Tomes (*System of Dental Surgery*) cites two cases of epilepsy, one being entirely cured, and the other much relieved, by the extraction of carious teeth. A case has been reported in a British journal where epilepsy continued for three years, evidently due to caries of the upper incisors. The disease entirely disappeared after the removal of the teeth. In this case the epileptic attacks returned after three years, and on examination a decayed molar with exposed pulp was found, which was likewise cured by the removal of the tooth.

A case has been reported from St. Bartholomew's Hospital, in which epilepsy in a child of five years was cured by removing the four temporary second molars that were decayed. In vol. iv, page 163, of *Dental Cosmos* is a case of epilepsy, reported by Dr. J. S. Ramskil, resulting from a decayed molar with some inflammation of the gums. The convulsions had continued for eighteen months. There was no return of the trouble after the extraction of the tooth. Dr. Fields of Indiana speaks of a boy five years old, with epilepsy resulting from the retention of a deciduous cuspid. The crown of this tooth was pushed into the lip by the permanent cuspid. The epileptic attacks in this case had continued for some months, and were cured by the removal of the diseased organ. In

the *Dental Cosmos*, vol. xii, page 103, a case is reported in which epileptoid convulsions of the muscles of the neck and right arm occurred almost daily for four years, these attacks being the result of a carious condition of a number of teeth. There was no return of the muscular spasm after the removal of the teeth. A few cases of epilepsy have been reported, caused by dental exostosis, and cured by the removal of the diseased teeth.

As the fifth nerve is the most sensitive of all the sensory nerves and its terminal filaments, especially of the second and third divisions, are so liable to be exposed, it would be well to make a thorough exploration of the buccal cavity in all cases of nervous affections, although these affections may manifest themselves in some remote part of the body.—*Dental Brief*.

SOME TESTS CONCERNING THE USE OF PUMICE AND OTHER GRITS IN DENTAL PROPHYLAXIS. By Joseph Head, M.D., D.D.S., Philadelphia. In 1887, before the name prophylaxis as regards the teeth was invented, Dr. Bonwill claimed that he could cure pyorrhea alveolaris by keeping the teeth clean. Examination of large numbers of his patients by various dental authorities seemed to maintain the accuracy of his statements. At the present time, with our much greater knowledge on this subject, it is generally recognized that though systemic causes may predispose to pyorrhea, local infection of the peridental membrane and gum tissue is an essential if not the primal cause. So much is this the case, that in a large percentage of instances if the peridental membranes and gums are freed from infectious accumulations, the loose teeth will tighten and the stripped gums of themselves will reattach to the roots. The one and only effective means of destroying masses of infection around the teeth is to remove these masses by instrumentation and polishers. When this has been done iodine, peroxide, glyco-thymoline and all the usual antiseptics will inhibit the growth or perhaps sterilize the remaining thin film of infection. But it is generally recognized that an antiseptic is powerless to remove masses of infection around the necks of the teeth, even though it may temporarily neutralize their pathological action.

I have taken extracted teeth covered with soft, mushy infection and dropped them into solutions containing respectively one and

three per cent peroxide and twenty-five per cent glyco-thymoline. At the end of three minutes they were removed with antiseptic precautions, washed in sterilized water and cultures made on both agar and blood serum slants from bacteria obtained from the film on the tooth. This was done four or five times for each antiseptic. In only one instance did they fail to show a growth at the end of two days. Sometimes the growths were so small and stunted as to require a glass to discover them, but they were always present except in one instance, where a three per cent peroxide was used on a mass for five minutes, giving complete sterility. These tests showed conclusively that while mouth-washes might inhibit growth temporarily, or even occasionally sterilize the deposits, they do not remove the mass of infection. Repeated washings of the mouth prove this again and again. After one per cent, or even three per cent, peroxide has been held in the mouth for from three to five minutes the viscid bacterial masses around the necks of the teeth will still be present, affording an abundant supply of food for further infection that can continue its pathological work almost as rapidly as though no wash had been used.

Mechanical removal being then a fundamental necessity when dealing with infectious masses, let us now consider the means by which this may be brought about. These means are scalers, orangewood stick, floss silk, brushes and grit polishers. The value of skillfully used scalers needs no elucidation. Let us first, therefore, take up the use of the orangewood stick and pumice. In the *Cosmos*, 1905, page 915, Dr. Miller says: "It is to my mind a question whether it is advisable by the excessive use of pumice to rub away the enamel cuticle at points where they are susceptible to decay, as I have found that the destruction of this membrane involves an increase of susceptibility of the tooth to decay." From such an authority this is a very important statement and certainly worthy of investigation. If, however, the enamel cuticle gives even partial immunity from decay at the proximal spaces, we would expect to find the proximal spaces of children from ten to eighteen much less prone to decay than between the ages of thirty to sixty, where the rubbing of the sides of the teeth against each other has worn them flat and so destroyed the afore-mentioned cuticle. Clinical experience does not seem to bear this out. Again,

in occlusal fissures of bicuspid and molars so prone to soften and decay, decay will never recur in a large proportion of cases, if, when the softening first begins, we cut out these lines with a bur until the smooth enamel beneath is reached.

This reminds us of the old idea of some that deposits ought not to be removed, because they protect the underlying tooth structure from decay. That the enamel cuticle does slightly retard the action of acid on the enamel is apparently shown by the fact that if we drop a normal extracted tooth into a solution of 1-4000 of lactic acid, the cusps on the grinding surface that have borne trituration will show a chalky surface a day or two before the sides of the tooth become similarly affected. But this protection is so insignificant in comparison with the protection that comes from cleanliness that in cases in which it is a question of cleanliness or enamel cuticle, cleanliness will take precedence and the enamel cuticle will have to be sacrificed.

But let us see what constitutes excessive use of pumice on the surface of the enamel. A bicuspid of sound enamel was screwed into a vise and a two-inch brush wheel charged with wet pumice was run against the cusp of the enamel for four hours at the rate of 2,600 revolutions per minute. At the end of this time the outlines of the cusp were still sharp and the enamel seemed to have suffered only to the extent of having received a beautiful polish. Let us now calculate how long in the course of natural brushing it would have taken this tooth to receive a similar amount of polishing. The method of procedure was as follows: The mouth was brushed in the normal way and the number of double strokes counted. These were found to be seventy-four. The length of each stroke on being measured was found to be two inches, but the spring of the bristles was found to reduce the actual passage of the movement of the brush over the teeth one-half inch at each end of the stroke, making the actual amount of bristle friction one inch for each stroke, or 148 inches for 74 double strokes. This friction being spread over both sides of the teeth, one side of the teeth receives not more than seventy-four inches of friction. These seventy-four inches divided by the thirty-two teeth give 2 5-16 inches, that each outside of the tooth received per brushing. As there were two brushings per day, this would make

2x2 5-16, or $4\frac{5}{8}$ inches, that each outside surface of the enamel received per day. Let us now calculate the distance the two-inch pumice-charged brush wheel went over the tooth—the wheel being turned in a lathe going at the rate of 2,600 revolutions per minute. First we must take into account that the brush during the time it ran was worn from two inches to $1\frac{1}{2}$ inches in diameter, making a mean diameter of $1\frac{3}{4}$ inches. This would give a mean circumference to the wheel of $5\frac{1}{2}$ inches. This $5\frac{1}{2}$ inches multiplied by 2,600 = 14,300 inches per minute that the brush traveled over the surface of the enamel, this would make it travel 3,432,000 inches during the four hours; 3,432,000 inches divided by $4\frac{5}{8}$ inches, the amount of brushing each tooth side gets per day, would make an equivalent of over 742,057 days, or about 2,000 years, that that side of the tooth would have been brushed in the normal cleansing process of the mouth. Of course, brushing with a stick and pumice might be more cutting than brushing with a brush, but this is offset by the fact that the wheel went at a rate infinitely faster than the brush in the mouth, making its action far more effective. Still, making any allowance for error, this experiment seems to conclusively prove that Methuselah could have brushed his enamel twice or even four times a day for his whole life without giving it anything more than a brilliant polish.

However, when we consider the effect of pumice on the neck of the teeth where recession has exposed the cementum, we have a startlingly different result. A one per cent pumice and precipitated chalk mixture run against the neck of a molar by a two-inch brush wheel for four minutes at 2,600 revolutions to the minute, makes a decided groove with a smooth surface not unlike the so-called chemical erosion found in the mouth. The same experiment tried with pure precipitated French chalk gives a similar groove. The same experiment tried with calox gives a similar groove. The same experiment tried with powdered carbonate of magnesia appears to make no perceptible impression, while running the clean, wet bristles of a two-inch brush over the cementum for seven minutes does not seem to do otherwise than give a polish without tendency to abrasion.

To make a further test a gold filling was inserted in the cementum and polished with precipitated French chalk with a two-inch

brush, as before stated. The cementum was cut away from the filling, leaving the sharp edges of the gold projecting above the cavity edge in a manner very characteristic of the groove so often seen in gold protected gingival margins. If in the brush test the gold had been worn down equally with the cementum, it would have seemed a conclusive proof that the dissolution of the tooth in the mouth and consequent projection of the filling was due to some chemical solvent, but since friction does make the gold filling show the characteristic sharp raised edge, there is strong reason to believe that much of the erosion found at the gingival margins may be traced to abrasion caused by tooth-brushes charged with excessive grit. Of course, the fact that the brush wheel travels many hundred times faster than the tooth-brush, makes it possible that the swift friction accomplishes not only a deeper groove, but a different groove from the more slowly moving mouth brush. Still, an examination of the specimens will reveal that the grooves are strikingly similar to those found in the mouth, and the fact the wet bristles were used for seven minutes on the cementum at such a high rate of speed without inflicting injury certainly shows that the high rate of speed of the bristles does not cause the groove, but that the grit does.

However, friction with grit will not explain every polished groove in the surface of a tooth. The polished grooves that run straight through between the teeth, as pointed out by Black, and the grooves that appear in the enamel near the cutting edge, cannot possibly come from the ordinary friction, and must be explained in some other way, possibly by a solvent, such as acid calcium phosphate, as suggested by Dr. Kirk. But in the light of these experiments and specimens, when we remember that the cuspid teeth are pre-eminently the ones that show gingival grooves, and that in a very small percentage of cases we find such grooves distally of the first molars and practically never in the third molars, there is good ground for the belief that a large percentage of these grooves are primarily and solely caused by tooth-brushes charged with grit. In the light of these facts, would it not be advisable to distinguish between chemical erosion and mechanical abrasion?

What are we then to do between the two horns of this dilemma? Grit abrasion on one side and infection on the other. Dark stains come on a tooth that the plain wet brush wheel in the engine,

brushing for two minutes, will not remove, giving more friction than the tooth-brush would give in a year. The same brush with a small quantity of grit will rapidly cleanse and polish the enamel beautifully. There seems to be no escape. When grit is necessary for cleanliness, grit will have to be used. In cases in which no cementum is uncovered, pumice may be used with safety and benefit. If the cementum becomes bared and the grooves appear, let these grooves be filled with gold or porcelain wherever necessary, but let the teeth and gums be kept clean, even though chalk and pumice have to be used. Such erosion is more easily combated than infection of the enamel, dentin, cementum and gums. Infection can only be efficiently opposed by a good brushing of the teeth and gums with a tooth-brush. Let the tooth powder and grit be used to the extent necessary to keep the teeth clean, but let them not be used more than is necessary. In some mouths the tooth-brush and carbonate of magnesia may be sufficient. Powder used once a day, or even three times a week, may be sufficient. Let more plain tooth-brushes be used up.

In closing I will sum up the procedure with which the patient should daily care for the mouth. First, every proximal surface of every tooth should be swept with floss to remove not only bits of food, but any colonies of bacteria that may exist. Second, the teeth should be brushed until they are bright and clean, a chalk or a chalk and pumice powder being used as often as necessary. Third, some mouth wash should be held in the mouth for two minutes or more to destroy or inhibit the growth of the microscopic bacterial film necessarily remaining after the floss silk. This procedure should be gone through morning and evening and is usually sufficient, but when an acid condition appears to exist in the mouth, the teeth should be bathed in milk of magnesia just before going to bed. I have not laid stress on agents for removing lump deposits, as I believe no efficient ones exist. Teeth can only be cleansed of deposits by scalers in the skillful hands of the dentist.—*Dental Brief*.

THE TECHNIQUE IN A DENTAL PRACTICE. By H. Clay Ferris, D.D.S., Brooklyn, N. Y. *Mr. President and Gentlemen*.—I wish to introduce to you my friend and patient, Mr. J. W. Davis, who will endeavor to describe his experience and education

in a series of visits to a dental office, and his treatment in a professional and business manner.

Gentlemen.—In December I called upon a dentist and rang his door bell. My summons was answered by a colored man in attendance, who was neatly dressed; and in answer to my query, "Is the doctor in?" answered, "Yes, Sir. Have you an appointment with the doctor?" My response was, "No." His next question was, "Do you wish to see him professionally?" My answer being in the affirmative, he ushered me into a reception room; went to a gong and struck it twice. I afterward learned had I an appointment with the Doctor, he would have struck the gong once; if my business was other than professional, he would have struck the gong three times. After waiting two or three minutes, the office door was opened, and a young lady dressed in nurse's uniform entered, asked my name and address, and if I wished to make an appointment, or if I needed immediate attention. Upon stating that I had had some trouble with a tooth, and would like to have that attended to, and a thorough examination made of my mouth, she excused herself, went to a button and pushed it twice, which was a summons for the doctor's assistant, and then asked me to remove my coat; conducted me to an adjoining room to a dental chair; adjusted about my neck a linen doily, which covered me to my waist; and stated that the doctor was engaged but that he would examine my mouth in a few minutes.

After a short time he appeared wearing a white linen coat; and with him a gentleman similarly garbed, whom he introduced as Dr. B. his assistant, and said that the latter would take care of my immediate needs, and would make an examination of my mouth; and that he would be pleased to make an appointment with me for future attention. The doctor returned to his office.

His assistant then took from a switch-board on the wall, a spray-tube containing $1\frac{1}{4}$ per cent solution of camphenol, which was electrically heated to a temperature of 90° , and sprayed my mouth and teeth; and after he had treated the tooth, he tapped twice with an instrument on the glass table in front of me, and the young lady secretary reappeared with a sheet of paper, which I learned was a diagram of the teeth. The assistant read off by a code with which I was unfamiliar, the position of the cavities in the teeth requiring attention, while the secretary marked them on the diagram. She

then made an appointment for a few days later and presented a steel engraved card with the day, date and hour marked upon it. I asked if the work performed should be paid for, and was informed that the doctor would render a statement at the end of the month. I was informed later, that during her absence from the room, she had looked up my rating in a blue book; and finding it there in good standing, had treated me accordingly; but had my name not appeared in the book she would have telephoned the office of the commercial rating company for my standing. If they did not know me they would look up my financial standing and report by letter; then she would have requested a payment for professional services rendered, with a statement that the doctor would talk business at my next visit.

At my second visit, I was received in a similar manner and after waiting fifteen or twenty minutes, was ushered into the doctor's office, seated in a dental chair, and a doily placed about my neck as before. I noted the dental chair to be upholstered in cane. The head rest being covered with aseptic linen pieces, which were adjusted as I took my seat. A dental table in front of me was of glass, which the young lady was wiping off with ammonia and alcohol; and upon the table she placed a sterile linen doily which was so cut as to leave a two inch margin of glass exposed. The doctor then went to a basin which he operated with his feet; using water that passed through a large filter; cleansing his hands with a sterile brush and a liquid soap which he took from a receiver by the pressure of his palm. After cleansing his hands he took from a glass shelf a sterile doily in which he dried them, hanging the same by a tape to the back of his chair. On his right stood a glass table on which were placed three glass bowls; one containing a solution of $1\frac{1}{4}$ per cent formaldehyde, another 3 per cent camphenol, and the third 1 per cent carbonate of soda. He moistened his hands in the camphenol, and I noticed that his mouth mirror and carrier-pliers were immersed in the formaldehyde. He then sprayed my mouth as before, using hydronaphthol solution.

He next called for the diagram of my mouth and examining it, presented to me the different methods in which the lost tissue could be restored. I told him that I would leave the matter in his hands. As I did not ask the expense, there was no reference made to it. He stated that he rendered a record monthly, and that I could

settle my account in that manner or wait until the work was completed. As I became better acquainted with the doctor, I learned that had my rating been poor when received from the commercial rating company, he would have placed a value upon his services, and added 15 per cent to the cost for emergencies, stating that he would expect my account to be settled the first of each month; but had my rating been N. G., he would have stated that as I was unfamiliar with his business methods, he would like to explain that when estimates were given, he would expect 50 per cent in advance as a retainer, and the balance when the work was completed, or cash on each transaction. He stated that in this way, he frequently handled "dead beats" satisfactorily when the contract was worth bothering with; as many people of this class would pay hundreds of dollars in this way, while if they were trusted for the same, they would never pay a cent.

The first professional work he performed was to give me what he called a hygienic treatment. He informed me that he had no fixed charge for this work, (unless arranged by contract for the year, when he would require a quarterly payment in advance, and three days notice given on failure to keep appointment) but that he spent as much time as was necessary to cleanse the teeth in all their parts; and that it frequently required the second or third treatment before the operator could positively state that all sources of irritation in the form of tartar had been removed from the roots of the teeth. The first step in this work was to coat my lips with a white vaseline, which he took from a collapsible tube; from another tube he took a quantity of paste which he told me was an anesthetic and an antiseptic, composed of:

R	White Vaseline	3	i
	Cocain	gr.	xiv
	Menthol	i	gr. iv
	Oil Peppermint	m	x
	Chloretone	gr.	ix
	Phenol	m	ii

With his forefinger he massaged my gums, rubbing in the spaces between the teeth. He then ordered a set of instruments which he called scalers, and his assistant placed them on the table in a metal tray, which was removable from his aseptic cabinet. She also

placed on the table a small glass dish in which she poured a solution, which was peroxid of hydrogen. The doctor immersed his instruments in this solution before carrying to my mouth and previous to going from one tooth to another with the same instrument. During and after this treatment, my mouth was sprayed with the hydronaphtol solution. On completion of this work the doctor said, "Table," and his assistant removed the instruments which had been used, placed them in the porcelain dish which swung on an arm from the cabinet, and conveyed them to the other side of the room, where they were put in a 1 per cent solution of sodium carbonate, and sterilized for ten minutes; after which they were dried on an aseptic napkin, and put in their position in the cabinet. The table was wiped off as before. The doctor then said, "Hygienic, hxx," which was his code price for the work completed, as he never mentioned figures in my presence. I did not know the charges for my work until I received a record at the end of the month.

During this visit, the doctor wished to speak to me in private, and I was surprised to see his secretary get up and leave the room. I was not aware of his giving any order for her to do so. His remark was, "As you were about to say, (Mr. Jones met you where)," "As you were" being her order to leave the room when used in a conversation with a patient.

At my next sitting, a tooth was prepared to receive a crown and a bite taken which was sent to the laboratory with two cards. I learned that there was a series of pigeon-holes arranged to receive these impressions, and one of the cards on which were printed my case number and name was hung under the one in which my case was placed, on pins provided for that purpose. On the other card was written the case number with the direction to the assistant as to what form of work was required and the day and hour it was to be completed. The latter card was returned to the office with the finished work and was placed on file to the credit of the assistant's laboratory work.

During my conversation with the doctor, he told me that his secretary rendered him a statement monthly, of all work done, and cash received with a balance due; also, bills due with the per cent of net profit; and on the first of each month she would inform him how much he had to make per day to equal his highest

year. He said that this acted as a "kicker" to him and stimulated greater efforts. It acted as a governor over his life and practice. If his social engagements tired him out so that he could not meet his records, he would cut them out and take more sleep; as his constant effort was to beat his highest record; and every three years he raised the amount of the value of his time. He did not make his charges on a strictly time basis, but used such a basis to calculate the expense of a given transaction. The surgical work and operations requiring exceptional skill were charged for accordingly. He also said that he received a salary weekly, as did his employes, and that he kept a separate bank account for his personal use; paying all office bills by check; giving his secretary power of attorney. That his cash book had to balance with his bank book, so that one kept a check on the other.

When my work was completed the doctor stated that it would be advisable to have my mouth hygienically treated once a month; but if I did not wish to do so, he would notify me, by card, in six months giving me an appointment on his examination day. If at that time I was aware of any irritation about my teeth, I could write for an appointment.

On the first of the month after my work had been completed, I received a steel engraved statement with the charge in full, also, a record of each transaction, and the amount charged, with the position of each piece of work marked on the diagram. A duplicate of this work having been filed in his office. If there were a number of patients in a single family, they received these records monthly, and made their payments as previously stated. This method will doubtless appear to you to be commercial in form, but prevents any misunderstanding.

I trust that this chronicle will be as interesting to the profession, as it has been lucrative to the doctor, and satisfactory to me.—
Dental Brief.

RATIONAL TREATMENT OF PUTRESCENT PULPS AND THEIR SEQUELAE. By J. P. Buckley, Ph.G., D.D.S., Chicago, Ill. It was my pleasure in May of this year to present before the Dental Society of the State of New York a paper in which I discussed, so far as I was able, the chemistry involved in the decomposition of the pulp tissue. At that time I emphasized

the phase of this process relating to the discoloration problem. It is my intention to-night to discuss more intimately the treatment of this condition and its sequelæ.

In the practice of medicine to-day there is a tendency to place the treatment of all disease conditions on a rational basis. Empirical methods of treatment are being rapidly relegated to the past. Nearly all the leading universities, whether they sustain medical departments or not, have well-equipped laboratories, and engage scientific investigators who devote their entire time in experimenting with drugs and remedies upon the lower animals, thus developing the field of pharmacology—a science which treats of the action of drugs and remedies upon the tissues, organs, and functions of the body. The development of this science demands from medical men, therefore, the practice of mono- rather than polypharmacy. The modern physician to-day diagnoses his case, and prescribes drugs and remedies because he knows which ones are indicated, and why. He no longer prescribes a miscellaneous combination of drugs, the action of many of which he does not understand, thinking and hoping that perchance one may effect a cure. This, in brief, is modern medicine.

What are we doing in dentistry to develop dental medicine, and to place the treatment of all diseased dental conditions upon a rational basis? Generally speaking, we are proud of the progress dentistry has made. Our pride is such that many in our ranks are not contented to be classed as specialists in medicine, but claim, and perhaps justly so, that we belong to a true and distinct profession. We are amazed at the rapid strides made in porcelain art and many other phases of dentistry; but can we really be proud of the progress made in dental therapeutics? When I read the various dental journals, and find that our literature contains so little on scientific and practical therapeutics, and so much on subjects of far less importance, valuable though they be, I feel that in our anxiety to develop certain branches of our calling, this branch has not received the attention which it merits. This was not true, to the same extent at least, in the earlier history of our profession, for by the efforts of some of these earlier practitioners to develop this all-important branch, anesthesia was given to the world.

If there is one condition more than another which in the past has

been treated by purely empirical methods, I believe it to be that of putrescent pulps and their sequelæ. The reason for this can be found in the apparent lack of interest which the profession generally has shown in the chemistry of pulp-decomposition. A knowledge of the changes wrought in the splitting up of the complex bodies of the dental pulp by micro-organisms is of vital interest to every practicing dentist; and yet how contented we have been, seemingly at least, to go on in the same old way, making no effort to familiarize ourselves with this important subject.

In most instances drugs have been selected and used solely because of their ability to inhibit the growth or destroy the vitality of micro-organisms, absolutely ignoring the fact that there were other things, such as irritating gases and poisonous ptomaines, found in the canal and tubular structure of the dentin, and ignoring also the further fact that it was as necessary to dispose of these substances as it was to destroy germ life. Few realized that the only method by which drugs and remedies could be scientifically applied to the treatment of these conditions was to have a definite knowledge of the intermediate and end-products resulting from the putrefactive process.

In order that you may follow me and understand the method of treatment which has been so successful in my hands, and which, in a general way, I have previously given to the profession, it will be necessary for me to ask your indulgence while I review briefly the chemistry herein involved.

So far as the chemical elements constituting living tissue are concerned, the pulp tissue differs very little if any from other animal tissue. I have made this statement before, and in one instance at least it has been interpreted that I have been "unable to discover that the pulp tissue differs in any way from animal tissue elsewhere." In all of my writings upon this subject I have recognized that the pulp tissue differs structurally and histologically from most other animal tissue; but I repeat that I have been unable to discover any difference so far as the chemistry of the tissues is concerned, all of the elements being present which are necessary for the formation of proteids, carbohydrates, and fats, and it is my opinion that these three classes of compounds are present as such in the original pulp tissue.

These elements may be, and probably are, arranged differently in

the various compounds, but this does not change the general line of reasoning on which the chemistry of pulp-decomposition is to be elucidated, and only from a knowledge of which can rational methods of correcting these conditions be inaugurated. It will be unnecessary for me in this paper to enter into a detailed discussion of the chemical facts which led up to the method of treatment which shall be outlined later. I shall only ask you to remember, therefore, that the chief constituent of all living tissue is the proteid bodies, and that it is largely the intermediate and end-products resulting from the putrefaction of this class of compounds which, if forced through the apices of the roots, are capable of producing pathological disturbances, as I shall now attempt to explain.

Whenever the dental pulp dies from any cause, and is invaded by pathogenic micro-organisms, one of the first changes brought about in the dead tissue is the splitting up of the complex carbohydrate and proteid constituents into simpler and well-known compounds. By this I mean to say that, conditions being favorable, the germs first act upon the complex and unstable substances, splitting them up into less complex compounds, many of which, however, are capable of further analysis, and the process goes on until the decomposition is complete. From the fermentation of carbohydrates result such compounds as water (H_2O), carbon dioxide (CO_2), and acetic acid ($HC_2H_3O_2$). The putrefaction of proteids produces hydrogen sulfid (H_2S), and ordinarily such ptomains as putrescin ($C_4H_7N_3$), cadaverin and neuridin ($C_5H_9N_3$). These ptomains resemble in many respects the vegetable alkaloids, and by some authorities are classed as animal alkaloids. In selecting drugs to correct this condition we should remember that all of these ptomains contain nitrogen—that peculiar, undecided, and indifferent element; that two of them, putrescin and cadaverin, are highly poisonous, capable of producing inflammation and suppuration; and that they all can be further putrefied, evolving ammonia (NH_3).

From our sad past experience we knew that some kind of mephitic gases were evolved in this process of pulp-decomposition which, if confined, would produce severe pathological disturbances. But just what the gases were, and how the unfavorable conditions were brought about, we were left to conjecture. Now we know, or I believe we do, that the main gases produced are ammonia and

hydrogen sulfid. We know, too, that when these gases cannot readily escape through a cavity, pressure is produced, thereby forcing the poisonous ptomains through the apices of the roots into the surrounding tissue, causing septic pericementitis and in many cases alveolar abscess.

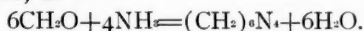
Treatment.—This much of the chemistry of this complicated process being known, we can with some hope of success select drugs which are truly indicated in the treatment of these conditons, and I come now to the discussion of remedies with some satisfaction.

To my mind there has been a needless discussion about the penetrating or non-penetrating power of coagulating agents in putrescent root-canals, for those of you who are familiar with the dental literature of the past know that some of the leading men of our profession have objected to the use of phenol, creasote, solutions of zinc chlorid, etc., in the treatment of these cases, because they are "powerful coagulators of albumin." These drugs are here contra-indicated, it is true, but not because they possess this property, for when the dental pulp is undergoing or has undergone the process of decomposition, the proteid constituents or coagulable substances have lost their former identity, and new compounds with entirely different properties have been formed.

In selecting drugs to be used in the treatment of these conditions I have therefore eliminated the question of coagulation, and have selected drugs which I know, if properly used, will unite chemically with the intermediate and end-products of decomposition, converting them into odorless and non-infectious compounds, as well as destroy germ life. In this connection we should remember that the putrescent condition has been brought about through the agency of micro-organisms by a gradual analytical process; and as stated above, among the products formed which must be considered in the treatment are hydrogen sulfid, the poisonous ptomains (putrescin and cadaverin) and ammonia or derivatives, the latter gas being evolved from the further putrefaction of the last-named compounds. It is well to remember also that fats are a class of end-products resulting from the putrefaction of proteid substances.

The main gases formed, then, are ammonia and hydrogen sulfid. Now, it will be necessary to dispose of these gases in order to hermetically seal the cavity—an object much to be desired; for by so doing we prevent the oral fluids from contaminating the

medicine within the tooth, the medicine from escaping into the patient's mouth, and the tooth from changing color during the time of treatment. It has been known for some time that formaldehyd (CH_2O), a gas which occurs in commerce in a thirty-seven per cent aqueous solution, and which solution is recognized by the United States Pharmacopeia of 1900 under the name of liquor formaldehydi, or formalin, will unite with ammonia, producing urotropin, a solid, as—



I believe, from a reaction which I have worked out, that formaldehyd, unites with basic ptomains, forming inodorous compounds and sulfur, a solid, as—



It is stated on good authority, too, that this same gas, formaldehyd, unites with basic ptomains, forming inodorous compounds. By the use of formaldehyd, then, we can change the irritating gases and poisonous liquids (largely ptomains) into non-irritating and non-poisonous liquids and solids. The official solution of formaldehyd, however, is too strong for general use; therefore, inasmuch as fats result from pulp-decomposition and are present as such in a putrescent root-canal, I selected tricresol (now also recognized by the U. S. Pharmacopeia of 1900 as "cresol") as the vehicle with which to dilute formalin. This agent was selected for three principal reasons: (1) It is miscible with formalin in all proportions, thus making a good pharmacal product. (2) It is a good disinfectant, much more powerful than phenol. (3) It acts chemically upon the fatty compounds, thereby disposing to advantage of these substances.

I shall now direct your attention to the details of a method by which I believe these conditions can be treated with the least inconvenience to our patients and to ourselves, and in making this statement I wish it understood that I do not belong to that class of practitioners who are ever on the alert for something easy regardless of results; yet I am always ready and anxious to grasp any method by which the comfort of my patients can be conserved and their interest not neglected. This is the plain duty of every dentist, and is one of the reasons why gold and porcelain inlays are receiving the favorable recognition to-day which their value merits. The tendency of this age is toward simplicity in all things.

We will now consider the treatment of putrescent pulps. Our first duty here, as in all treatment cases, is to make a correct diagnosis, after which the rubber dam should be adjusted in every case where it is possible to do so, and all the teeth included sterilized. For this purpose I use either a ten per cent solution of formaldehyd to which a small amount of borax has been added, or a 1:500 solution of mercury bichlorid in cinnamon water. After using one of these solutions the teeth are bathed in alcohol; with a large round bur the pulp-chamber is freely opened, exposing all of the canals, but no attempt is made to remove the contents therein. Now on a small pledget of cotton the following remedy is placed in the plup-chamber and over the mouth of each canal:

Original formula.

R—Cresol,
Formalini, aa f̄j. M.

Sig.—Use as directed.

It is always best to seal the cavity with a quick-setting cement, for the remedy should be hermetically sealed and pressure must be avoided. This dressing can remain until you desire to have the patient return for a subsequent sitting. I prefer to leave it about two or three days. However, it can be changed safely the following day, and no harm follow if it remains a week or more. At the second sitting the dressing can be removed and the canals mechanically cleaned, when a 1:500 solution of mercury bichlorid in hydrogen dioxid—suggested to me by Dr. M. L. Rhein of New York—is gently worked down into each canal, after which the canals should be dehydrated with alcohol and warm air, and the modified formula placed on cotton in each canal, and the cavity again hermetically sealed:

Modified formula.

R—Cresol, f̄ij;
Formalini, f̄j. M.

Sig.—Use where indicated.

It is well to allow this dressing to remain for at least three days, by which time the remedy will have sterilized the entire tubular structure of the dentin, thus establishing asepsis. All that is necessary now to prevent recurring sepsis is to thoroughly fill the canals.

In the treatment of those cases in which the patient does not present until the confined gases had been forced through the end

of the root, carrying the poisonous ptomaines into the surrounding tissue, it is our duty to try and aid nature in aborting an abscess. It is in these cases that good judgment must be exercised, and extreme care taken. There is no condition which we are called upon to treat wherein a practical knowledge of pathology and therapeutics will serve us better than in this particular case. Frequently patients delay visiting the dentist until the infection has progressed to a point at which all remedies will fail in aborting an abscess; but in many instances this result may be prevented by the proper use of drugs. After hermetically sealing our remedy in the tooth containing the putrescent pulp, as outlined above, our attention should be given to the treatment of the infected alveolo-cemental membrane. In order to control the infection, and at the same time aid nature in readjusting the abnormal condition, it is not only our privilege, but our duty in these severe cases to administer internal drugs. Here alterative drugs are indicated. The great representative of the alterative class is potassium iodid, which can be given in the following prescription:

R—Potassii iodidi, ʒjss;
Syrupi sarsaparillæ comp., fʒiij. M.

Sig.—Take a teaspoonful in water after meals.

The general directions should be to have the patient take a teaspoonful three times a day after meals, but in these cases of septic pericementitis or incipient abscess it is best to direct the patient to take a teaspoonful every two hours until three or four doses are taken, and then follow the directions written on the label. It is well also to avoid the accumulation of blood in the part. To prevent this, saline cathartics are indicated—one that can be given is the official solution of magnesium citrate, a prescription for which follows:

℞ Liquoris magnesiæ citratis, f̄ssij.

Sig.—Take one-half at once, and the remainder in two hours if necessary.

I do not give the remedies here mentioned in all cases of incipient abscesses, as the local treatment will suffice in most instances. No therapist can tell exactly what internal drugs he would suggest without seeing the case and knowing the history, for there are many circumstances and conditions which modify the effect of drugs, one of which is climate.

In malarial regions and in the spring of the year, in the locality in which I practice, the salts of quinin can be given with beneficial results. The salt which I prefer in the cases under consideration is quinin bisulfate. Nearly all pharmacies have the salts of quinin put up in the form of pills. While these pills may be given, it is much better to write a prescription for capsules. The gelatin capsule is soon dissolved in the stomach; thus we obtain the action of the drug more rapidly than when given in the dry, hard, pilular form. The following prescription can be written for the drug in two-grain doses:

R—Quininæ bisulphatis, gr. xxiv.
Ft. capsulæ no. xij.

Sig.—Take one capsule every hour until the effect becomes noticeable.

Quinin acts differently upon different individuals. Most adult patients know the effect of this drug upon their systems, and therefore will be able to aid the dentist in determining the amount to be taken.

One of the most prominent symptoms with which we have to contend here is pain. In most cases the pain will soon subside after the remedy has been hermetically sealed within the tooth; however, it is necessary occasionally to administer drugs which act upon the central nervous system, thereby controlling the pain. There are several drugs which, if properly given, will produce the desired effect. I have had much satisfaction in the use of acetanilid. The U. S. Pharmacopeia of 1900 recognizes a compound powder of this drug which can be prescribed:

R—Pulveris acetanilidi comp., gr. xij,
Ft. chartulæ no. ij.

Sig.—Take one powder at once and the other in two hours if not relieved.

Chronic Alveolar Abscess. I shall now direct your attention to the treatment of chronic alveolar abscesses. There are two varieties of alveolar abscess—those without an external opening, except perhaps through the cavity in the offending tooth, and those which are discharging through a sinus. In these cases the decomposition of the pulp tissue is complete, the intermediate products (ptomains and amido-acids) have largely been broken up, and pus has been formed from the tissue surrounding the end of the roots.

In treating that variety of abscess which is without an external opening, our method is somewhat different. The tooth should be located, the rubber dam adjusted, and the teeth sterilized as before, then the pulp-chamber is opened with a suitable round bur. Usually the pus flows freely, in which event it is permitted to do so, pressure being made on the tissue immediately over the end of the root. It should be our effort to mechanically evacuate as much pus at each sitting as is possible. This being done, we have no necessity for using formaldehyd in the same strength solution as in those cases in which the pulp-chamber, root-canals, and tubuli are filled with the intermediate and end-products. The modified formula will be useful here. The canals should be dried with alcohol as thoroughly as possible, and the remedy on cotton hermetically sealed in each canal. It is, however, impossible at this sitting to get the canals dry, and it is unnecessary to have them so, for the remedy will penetrate where moisture is present. This is an advantage over most remedies suggested for this purpose.

In those cases in which there is a copious flow of pus at the first sitting, the original formula can be used, and the dressing should be changed every day until it can be removed without the pus flowing from the canals. When pus is forming rapidly at the ends of the roots the dressing soon becomes dissipated, the remedy is neutralized, and it is a loss of time to leave it in the canals more than twenty-four hours. Unless there be some complication, the pus formation should be checked in one or two treatments; at which time the modified formula can again be used. It is now possible to change the dressing too often. The formation of pus has been checked, and the tooth should not be disturbed for at least one week or ten days, in order to give nature a chance to effect a cure. If at the end of this time there is no evidence of pus and the case gives a favorable history, the canals can be filled. Should there, however, be a slight odor, although the tooth has not caused any trouble, we are not justified in filling the root. In these cases we can further modify our original formula by taking one drop of the mixture and adding two or three drops of cresol. It should be remembered that the value of formaldehyd in any remedy to be used in the treatment of these conditions depends upon the power this agent has of uniting chemically with the hydrogen sulfid, ammonia, and the poisonous ptomains. When these substances are

not present, formaldehyd, especially in this strength solution, is contra-indicated.

I mention this here because I know this remedy is being used for nearly all conditions. It should not be. It is strange how some practitioners expect to find one drug or remedy which can be used in every case all through their practice.

Quite frequently in these abscess cases, after the formation of pus has been checked we have a weeping of serum from the canals. An excellent remedy to use in this case is eucalyptol to which thymol has been added in the following proportion:

R—Eucalyptol,	f3j ;
Thymol,	gr. x. M.

Sig.—Use as directed.

If this remedy fails to check the secretion, and the fluid is serum, not pus, no hesitancy need be felt as to filling the root, although the canals cannot be dried.

Occasionally we find a chronic abscess of this variety and it is almost impossible to check the formation of pus by applying drugs to the canals of the teeth. In those cases in which the pus continues to flow freely when the dressing is removed at the third or fourth sitting, some complication can be expected. It is necessary then to force some stimulating agent through the apices of the roots, after the pus has been mechanically evacuated. The stimulating agent which I use almost invariably is a fifty per cent solution of phenol-sulfonic acid. This preparation is made by heating phenol in an evaporating dish, adding the sulfuric acid, and then the water slowly while hot. If the resulting solution is not clear, it should be filtered by packing cotton in the neck of a funnel and passing the solution through. In resorting to this means of bringing about a more acute condition, I desire to emphasize the necessity of first evacuating the pus as completely as possible before using the remedy, after which the agent should be gently forced through the apices, and the modified formula, or even cresol alone, sealed in the canal. It will be found that one or two treatments will usually check the formation of pus, after which the case can be treated as an ordinary abscess of this kind. In case this method fails to effect a cure, however, it will be necessary to surgically establish an opening through the overlying process and soft tissue,

and treat as for an ordinary discharging abscess—which treatment we will now consider.

In those cases in which the pus is discharging into the mouth through a sinus, our first duty is to locate the offending tooth. This is generally a simple matter, for the reason that the sinus usually opens immediately over the tooth from which it comes. The pus in making its exit, however, follows the line of least resistance, and in some cases the condition of the process is such that the pus burrows mesially or distally, and opens through the gum at a point several teeth removed from the one which is causing the trouble. These are the cases that are difficult to diagnose, especially those in which the abscess has been discharging for some time, when there is not much tenderness in any special tooth, and there are several pulpless teeth on this particular side of the mouth. Sometimes two teeth containing putrescent pulps have a common sinus. In this case it would be impossible to heal the tract by treating only one of the teeth. The use of a silver probe will be valuable in all such cases. By gently working the probe mesially or distally, the sinus can be explored and the offending tooth or teeth located without drilling into innocent teeth—a discouraging procedure to both patient and dentist. The tooth being located, all that is necessary to effect a cure—there being no complication—is to force some bland solution through the root-canal and sinus, thus being certain it is well established, cauterize the tract, hermetically seal in the canal or canals the same agent used for this latter purpose, and at the subsequent sitting fill the root.

The general method of applying drugs to the treatment of these conditions is so well known that I refer to it but briefly. There are two objects in forcing a bland solution through the sinus; one is to be certain that it is open, and the other is to mechanically wash out the pus. Whenever pus can be mechanically removed, it is always better to dispose of it by this means rather than attempt to do so by the use of some chemical agent. It is common practice, I believe, after the sinus is thus established, to use a solution of hydrogen dioxide. This is often a dangerous procedure, and always unnecessary if the first solution has been used in sufficient quantity. For cauterizing the fistulous tract I use phenol, unless the abscess is of long standing, and I can reasonably sus-

pect a roughening of the end of the root or process through which the pus has been discharging. In these cases I use pure phenol-sulfonic acid. This agent rapidly disintegrates cotton, therefore it should be applied to the canals on shreds of asbestos or silk, when with unvulcanized rubber and a suitable instrument it can be forced through the sinous tract, cauterizing the same, and also chemically dissolving any sharp edges of root or process, which may be a source of irritation and prevent healing. I do not believe in delaying the root-filling long after the sinous has been cauterized, for by filling the root as soon as we are certain that the sinous is healing, we avoid a weeping condition which usually exists, and which is annoying when this part of the treatment is delayed for one month or six weeks, as advocated by some writers.

While the permanent filling of the root and the bleaching of the tooth, if necessary, constitute a part of the treatment of these conditions, I have already consumed so much time that this phase of the subject will not be discussed. I must take occasion here, however, before closing, to answer briefly a few queries which Dr. Kirk of Philadelphia, in the November *Cosmos*, has asked editorially in his review of the paper which I read before the Dental Society of the State of New York in May of this year.

Rationalism of the Method.—The only point which Dr. Kirk has raised bearing any relation to the subject under consideration to-night, is this: "We are constrained to inquire into the rationalism of preceding the bleaching operation with sodium dioxid by a treatment with a mixture of formaldehyd and tricresol. What desirable therapeutic end can be attained by the formol-tricresol combination that cannot also be attained as well by the sodium dioxid? Why use both when the latter must be used under the circumstances anyhow, and is sufficiently antiseptic and germicidal to effect complete sterilization? Why first destroy the germ and its waste products with a cannon and then destroy them some more with a Gatling gun?" The answer to these questions is plain to anyone who has used both methods for treating putrescent pulps. There are many cases in which the pulp is undergoing the process of decomposition in which the tooth, as yet, has not been discolored. All such cases can be treated by the method which I have outlined to-night, without the tooth changing color.

As I endeavored to make clear in the article in question, I use sodium dioxid in those cases in which the tooth was discolored before the patient presented for treatment; and then only after the tooth has been treated and the canals filled, for it is not used with the end in view of establishing asepsis—this has been accomplished by other and better means—but for the sole purpose of restoring the natural color to the crown of the tooth which is to be saved by filling. I was forced to abandon the use of sodium dioxid for treating putrescent pulps, for, in my hands, the method was impracticable.

I am not only willing, but anxious to have the rationalism of the method which I have just outlined in detail questioned by those who have given it a fair trial and have found it wanting; but it is unfair to myself and manifestly unjust to the profession for a man with the professional standing of Dr. Kirk to question the rationalism of the method without having tried it, and it is evident that he has never used it, or his clinical experience would have forcibly answered the questions which he so thoughtlessly propounds to me.

In considering this subject to-night I have gone into details to an extent which, perhaps, may have been tiresome. This was done because the remedy which I suggested for the treatment of putrescent pulps and abscesses without an external opening is being used in cases in which it is contra-indicated. I know that the remedy has been sealed in teeth from which live pulps have been removed, and used also in other places where it should not be. It is a valuable remedy if confined to the canals of the teeth and used where indicated, but it is a most dangerous one if used carelessly or where contra-indicated. For this reason I have discussed details to-night. I do not refer to this in any apologetic spirit, for I remember that "whatever is worth doing at all is worth doing well," and that the great men of the world are not those who despise "small things," but rather those who improve them the most carefully. One day Michael Angelo was explaining to a visitor at his studio what he had been doing since his previous visit: "I have retouched this part—polished that—softened this feature—brought out that muscle—given some expression to this lip, and more energy to that limb." "But," said the

visitor, "these are trifles." "It may be so," replied the sculptor, "but you must recollect that trifles make perfection, and perfection is no trifle."

The method which I have outlined to-night may not be perfect in every detail. I do not claim that it is the only one by which good results can be accomplished, but I do claim that it is practical, and is along rational lines, which cannot be said of all methods suggested for the treatment of these conditions.—*Dental Cosmos*.

Clinical Digests.

A METHOD OF ROOT RESTORATION, WHEN ROOT IS BADLY DECAYED, USING AMALGAM WITH PURE SILVER MATRIX. By W. E. Fribley, D.D.S., Chicago, Ill. Pure silver plate, 31 or 32 gauge, is used, and 18-karat gold solder. Make matrix slightly smaller than root to insure snug adaptation. If at first matrix is too small it is easily enlarged with contour pliers. After having matrix fitted to root, if it be an anterior or single rooted tooth, insert a conical shaped pin (about the size desired for post in permanent crown) coated with wax, into the root-canal. Mix amalgam (any good alloy), then make a mix of thin cement, use stiff broach to apply cement to floor and walls of cavity around pin, being careful not to get any cement on margins. Take pellets of amalgam and incorporate in cement. Having a strong matrix, much of the mercury can be expelled from the amalgam. Silver, having the greatest affinity for mercury of any of the metals, will absorb the excess mercury quickly, but will not amalgamate with the filling.

In a short time, but preferably at another sitting, the pin can easily be removed by placing on it a hot ball burnisher, thus melting the wax around it. Use a small hatchet excavator, or any small hooked instrument, to remove matrix. It will slip off easily, being partially disintegrated, which usually is the case.

Now proceed to treat the tooth if necessary. To make the crown you have a perfect measure of the root in the matrix removed. Make any kind of crown, preferably a banded one. This same method is used for all the teeth unless decayed beyond all

repair. Silver being so flexible and malleable, it is readily trimmed and fitted to any root after overhanging gum tissue has been removed. This process insures a clean, dry root for treatment when necessary, and also a perfect form to build up the tooth for crowning or to leave as a filling. Silver has the greatest advantages as a matrix metal, as it is less irritating, more easily adapted, very pliant, and lastly, it absorbs the mercury more readily than any other matrix metal.

A NEW AND VALUABLE METHOD OF MAKING MATRICES. By R. Ottolengui, M.D.S., New York. I recently received from Dr. Emil Schreier of Vienna a suggestion which, after trial, I unhesitatingly pronounce to be one of exceeding value in the technique of all kinds of inlay fillings. There can be no doubt but that the stability of an inlay is much enhanced by the depth to which it may be introduced into the cavity. Heretofore in very deep cavities it has been necessary to lessen the depth by strata of cement or other material. Dr. Schreier suggests the use of what is known as gold beaters' skin. This is an exceedingly thin bladder-like material which gold beaters use when beating the metal into foil to avoid tearing.

In making a matrix the gold beaters' skin is placed on the under side of the foil and therefore next to the cavity walls. With ordinary care the gold can thus be forced to a very considerable depth without tearing. After the edges are thoroughly burnished the gold beaters' skin is easily removed and the matrix can be returned to the cavity for a final adaptation to the walls.

In the production of either porcelain or gold inlays by the so-called impression method the gold beaters' skin is of equal value, as the matrix material can be forced into deeper grooves and undercuts without tearing, than can be done without this protection, as the gold beaters' skin acts as a cradle to support the matrix while it is being carried to place.

Immediately after hearing from Dr. Schreier I communicated this information to a number of friends and one of these Dr. R. M. Gaylord of New Haven, Conn., while awaiting the arrival of some gold beaters' skin which he had ordered, experimented with fine china silk and found that it served the purpose admirably. I think, however, that this is too slippery and the

raveling is also objectionable. Klewe & Co. likewise experimented with a very sheer muslin, and this is apparently better than the silk, but in my opinion not so good as the gold beaters' skin. It has the advantage, however, that it can be used wet and will thus temporarily adhere to the under side of the gold, and if introduced into a wet cavity is less likely to slide about. There is, therefore, considerable value in this suggestion, especially as it is more readily obtainable than the gold beaters' skin.

The profession, however, is indebted to Dr. Emil Schreier, who has given us heretofore many valuable methods in dentistry, for this idea of using a cradle in connection with the making of matrices.—*Items of Interest.*

ACCURATE ADAPTATION OF UPPER DENTURES. By Frank C. Bliven, D.D.S., Worcester, Mass. This clinic is given to illustrate a method of making upper dentures by which they will retain their position in the mouth when in use.

Various experiments have been made to obtain a good fit with relative stability. One experiment frequently tried is the making of an upper denture from an accurate impression without treating either. The results have seldom been encouraging, as they will not retain their position when in use, though they may seem to fit the mouth. This method will not meet with success when the bones of the mouth are covered with deep, soft tissues.

But the varying conditions must be met according to their requirements, and success will depend entirely upon the knowledge of these varying conditions when intelligence is displayed in their treatment.

Air chambers, and other so-called suction appliances, are misleading and calculated to result disastrously to the patient, if not to the dentist who depends upon them.

A plate resting upon air or the lack of it, i. e., a vacuum, must necessarily have a very unstable support, since air or its absence as a vacuum is a flimsy support for anything we wish to maintain in a relative condition of stability. However artistic or ornamental an artificial denture may be, it is of no practical value unless it will retain its position firmly in the mouth when in use.

There are other reasons than those mentioned for unstable artificial dentures, but the principle which this clinic purposes to illus-

trate is a fundamental one, which, when properly applied, will insure success.

The rule is whenever the tissues are hard carve the impression sufficiently to just clear the plate from pressure upon them when in use. Where the tissues are soft carve the model until the soft tissues are compressed to render the plate immovable upon the hard tissues.

Carve the upper side of projections sufficiently to prevent the air from entering beneath the plate when it has settled firmly into position. The same result may be obtained by building up the model with air-chamber material where the impression is trimmed.

Whichever method is employed, the principle involved is the same and like results must follow.

The practitioner must not expect a complete success at the beginning, for only by practice can he acquire the necessary skill to compensate him for his earnest efforts.

I have used this method for years and can assure all who may adopt it, and apply it with good judgment, success in making artificial dentures, that will gratify both patient and dentist beyond their greatest expectations.—*Items of Interest.*

FRACTURED UPPER MOLARS. By James W. Birkland, D.D.S., Chicago. The fracture of upper molars through the bifurcation, separating the lingual from the buccal roots, while not very common, is sufficiently so to merit some notice. Having had three cases during the past five months, I am moved to call attention to this particular disaster.

This accident occurs usually in pulpless teeth where the cusps are prominent and the teeth are used with much force, and where the buccal and lingual margins of the filling have not been laid well to the crests of the cusps. I believe none but those who follow the rules laid down by Dr. Black take the precaution, and many are not even aware of the necessity of laying the margins to the crests of the cusps in these frail teeth. It not only prevents the fracture of the buccal and lingual walls, which is common, but also the occasional fracture through the bifurcation.

I have had one case of a split through the bifurcation of a second molar containing a live pulp and a small occlusal filling. The cusps were very prominent and the occlusion perfect. The

patient used his teeth vigorously and had previously split off the disto-lingual cusps of a sound lower molar.

In treating these cases, first pass a wire around the tooth and twist the ends tightly together, as in measuring a root for a band. For this purpose use annealed German silver wire, gauge 24, but in an emergency ordinary binding wire may be used, wrapping it around the tooth several times. A strong clamp placed on the tooth will also assist materially. With the parts thus firmly bound together, grind down the cusps and remove the filling. Then with an inverted cone bur .8 of a mm. in diameter, cut a groove in the mesio-buccal angle, starting at entrance to the mesio-buccal canal and drawing it occlusally. A similar groove is cut in the disto-buccal angle. The entrance to the lingual canal is then enlarged and a groove cut toward the mesio and disto-lingual angles, making a dove-tail in each fragment. Carefully fill the cavity with amalgam. The patient is now dismissed with the wire ligature still in place, and cautioned not to use the tooth until the next morning. At a subsequent sitting the ligature is removed and the tooth prepared for a crown. It can be ground freely and the enamel cleavers used with force, without danger of disturbing the fragments. A properly fitted gold crown eliminates all danger of future disturbance.

This method I have followed for the past five years without a single failure.—*Northwestern Dental Journal*.

BUILDING THE INLAY. By J. Herbert Barton, D.D.S. In the selection of colors for an inlay note the variations in color of the natural tooth. There are usually three or more colors, or shades of colors, in a tooth. The foundation of an inlay representing the dentine should be yellow (presuming that the tooth is vital) and the overlying colors should approach the color of the enamel in their respective positions. If the matrix lining is to be used, a thick layer should cover the matrix to within about one-half millimeter of the margin and be fused to a high glaze. The foundation body should be applied over the white porcelain and be contoured to replace the dentine. It should be fused, provided it is of a higher fusing porcelain than that used to replace enamel. Care should be taken to prevent porcelain of dif-

ferent colors from mixing when applying them to their respective position. If the colors are applied separately and biscuited, then a uniform color is applied over the entire mass and properly fused; the colors will be true and the fused porcelain will approach more nearly the natural tooth structure in appearance.

Pure platinum cannot be melted by the ordinary gas blow pipe, nor can it be directly alloyed with gold, excepting at a very high temperature maintained for a considerable length of time; but there are some metals with which it can be alloyed, and once alloyed with the it readily fuses with gold.

In some experiments conducted by myself I attempted its fuse with the ordinary gas blow pipe equal parts of platinum and gold, platinum and silver, and platinum and copper.

In the case of the platinum and gold, the platinum could not be induced to melt at all, but gold merely melted and flowed over and around it.

In case of the platinum and silver, the platinum partly fused and made an indifferent alloy, some pieces only partly melting.

But with the copper combination the platinum fused thoroughly, making a homogeneous piece of metal throughout. Once alloyed with copper, it readily fused and mixed with gold. Applying this to the making of platinized gold, I take my alloy, consisting of platinum, silver and copper, and thoroughly melt, then add my gold. I have found the following a splendid formula:

Pure gold, 18 parts.

Pure platinum, 2 parts.

Pure silver, 2 parts.

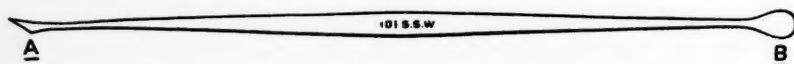
Pure copper, 2 parts.

Place the platinum, silver and copper on a hollowed piece of charcoal on the melting frame, and using borax for a flux direct a good hot blast of flame from any good blow pipe with foot bellows (I use a Melotte's pipe with No. 7 Buffalo foot bellows) and the metals will soon fuse; get the heat as intense as possible, and hold it there for a few minutes, then add your gold and remelt, shaking or mixing with a piece of wood to insure a good mix. Pour into an ingot or it may be left to cool on the coal, after which it can be rolled into plate or drawn into wire.

This metal is second only to steel in hardness and elasticity and has a high fusing point. It is much superior to the clasp metal sold at some of the depots and is excellent for making clasps for partial rubber dentures, bands, ribbons, wires, screws, etc., for regulating appliances, posts for Richmond crowns, etc.—J. Herbert Barton, *Cosmos*.

A METHOD FOR PRODUCING THE NATURAL CONTOUR OF ARTIFICIAL TEETH ON THE LINGUAL AND PALATAL SURFACES OF ARTIFICIAL DENTURES. By William Middleton Fine, D.D.S., Philadelphia, Pa. First, take a good plaster-of-Paris impression, and if a vacuum chamber is indicated it should be carved in the impression. The next step is to prepare the cast, and from that the wax bite; then the articulation, and finally the base-plate. The bite-plate will then be ready for trial in the mouth. The teeth are set up in the usual way in wax, the gums carved, and the whole denture made to reproduce the

FIG. 1



Carving instrument.

lost teeth and supporting tissues. The case is then tried in the mouth, and, if found to be perfectly satisfactory in every way, is then taken to the laboratory for finishing. A small specially designed spatula is used for carving the lingual and lingual surfaces, shaped like the instrument shown in Fig. 1. The end (A) is the one mostly used in carving; the opposite end (B) is used for removing the wax from between the teeth and in trimming the denture, the edge being very thin.

Hold the articulator in the left hand, and open it so that the upper denture will be in front of the operator and at the top; start at the last tooth on the left side and proceed to carve the wax, using the point (A) of the spatula; carve downward, using the lingual surface of the porcelain tooth as a guide, and shape the wax to represent the natural tooth as it stands in the natural gum. (Fig. 2.) After the lingual surface of the second molar has been carved, proceed to the first, and so on around the arch of the denture until the work is completed. Then prepare the

rugæ. To do this, one must have several dies of either pure tin or zinc; but tin is better. Secure an impression of a mouth having well-defined rugæ, or, better still, if the patient has such

FIG. 2



well-defined rugæ, take an impression thereof, and make a die. After obtaining the die, take a piece of tin foil, No. 40, and burnish it over the rugæ on the die, using the rounded end of a lead-pencil eraser to press the foil into contact with the die. A piece of tin foil should be used large enough to cover the entire lingual surface of the wax denture, and to extend one-quarter inch beyond the margin of the lingual surface. After the burnishing

FIG. 3.



Vertical cross section of upper denture incorrectly finished.

FIG. 4



Vertical cross section of upper denture correctly finished.

is completed, remove the tin foil very carefully, and fill the depressions in the side next to the die with wax by melting it on a spatula and dropping it on the tin foil; then heat the spatula quite hot and iron it down smooth. By this means the surface that is brought into contact with the lingual surface of the wax denture will be perfectly smooth. After this phase of the work is com-

pleted, press the piece, wax side down, into the wax denture and finish around the teeth by burnishing very carefully, but do not burnish the edges down flat. Allow them to stand up at right angles, so that when the case is flaked the free edges of the tin foil will be embedded in the plaster, and held in place. The result is a tin-foil covering to the lingual surface of the wax denture;

FIG. 5.



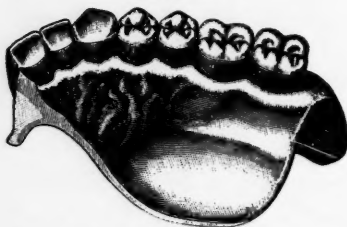
Manner of finishing palatal surfaces of molars and interproximal spaces

FIG. 7.



Lower vulcanite denture showing lingual contour correctly reproduced

FIG. 6.



Upper vulcanite denture showing natural contour and rugæ correctly reproduced.

FIG. 8.



Cross section of lower vulcanite palate correctly finished.

then after the tin foil has been applied to the gums, to which it is burnished in the same way, the case is ready for flaking.

After the wax has been boiled out, cover the cast with very thin tin foil, No. 4 or No. 6. Pack the case with rubber in the usual way, and vulcanize. The dentures are finished by scraping, sandpaper, pumice, chalk, rouge, etc., in the usual way.—*Dental Cosmos*.

MAKING AN INLAY: A CASE FROM PRACTICE. By G. B. Mitchell, D.D.S., Buffalo, N. Y. The case presented represents not a difficulty overcome, but the difference of cavity preparation, with markedly different results, and is a lesson to novices.

An incisal, gold restoration was removed from the upper right,

central incisor. Cavity resulting after preparation, as shown in Fig. 1, the cavity not including mesial or distal corners. The walls and basal portion were inclined to be saucer-shaped, and therein lay our Waterloo.

When the patient presented I took a *new burr* (parallel sides), which comes with the porcelain rod system, and by cocaineization succeeded in drilling parallel walls and at right angles to flat floor as shown by the dotted lines in Fig. 2.

A practitioner, on seeing the case, thought no matrix could be burnished into such a narrow "box-shaped" cavity, and suggested



Fig. 1.



Fig. 2.

die and counter-die of cement. I tried the same, with negative results, then burnished 1-1000 platinum into the cavity, and succeeded in inserting the same safely, minus floor, owing to large tear. I placed a small piece of platinum on the floor, and then used the gum-camphor scheme. Porcelain practitioners owe a great deal to Dr. C. C. Allen of Kansas City, to whom we are indebted for the scheme of using gum-camphor in our matrix formation. It is the greatest aid in inlay work of which I have any knowledge.

Lately, I have used the camphor and also invested my platinum matrices in asbestos, this giving me 50 per cent betterment in adaptation of the inlay. It may take a little more time, but in a few years the patient does not remember whether it took half an hour or three hours; but he does remember whether or not the inlay is *in situ*, and looks well. The finished inlay gave me an absolute fit (it could hardly be dislodged, when tried in) and was one which, when cemented, nothing save tooth fracture could dislodge.

To repeat, *Use gum-camphor, invest matrices, also obtain pressure when cementing to place by tying in the inlay, and see the great improvement which will result.*—*Dental Brief.*

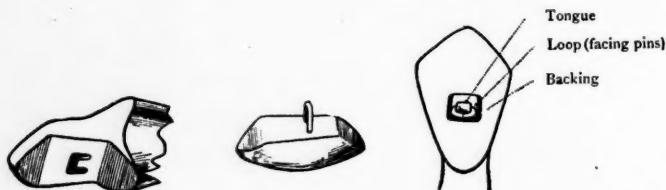
RESTORING BROKEN CROWN FACINGS. By W. G. L. Spaulding, D.D.S., Toronto, Canada. In doing this by any method, three points are exceedingly important:

(a) To fit the facing to the backing so as to avoid crevices and projecting edges.

(b) To avoid weakening of gold backing or of the dowel.

(c) To secure facing so that it will not loosen.

Procedure.—Grind or clip the pins of the late facing flush with backing. With a lubricated drill make holes through the backing to suit the pins of new facing. This preparation guides the facing true to place, which will be of service during the grinding to fit backing. Use thin carbon paper for fine adjustment of facing. Bend ends of pins to form loops and invest to unite them with gold or silver solder. While investment dries and heats, finish



the preparation of the backing. Reference to illustration will make this simple. A U-shaped slot is cut with small dental fissure-burr, starting in the pin-holes already made and thus making a tongue around which the loop of facing will fit. A pear-shaped or round burr, not too sharp, will cut away enough of the tongue from palatal side to allow the loop to go to place. Lubricate the burr with vaseline or glycerine.

Having soldered the pins of facing it will be cool enough now to try in place for fine adjustment. Cement facing to place, holding a piece of unvulcanized rubber against the palatal aperture to prevent the cement forcing through. A small ball of soft amalgam at hand quickly closes the aperture in backing and keeps the loop immovable.

Advantages of the Method.—Security of facing, accurate adjustment, and an unweakened dowel in the crown.—*Dominion Dental Journal.*

LARGE GOLD INLAYS AND METHOD OF SWAGING.
By D. I. Wadsworth, D.D.S., Portland, Ore. In describing this method of constructing a large gold inlay I have selected a lower first molar on account of the frequency of these cases, more especially in children, from ten to sixteen years of age.

In a great many cases it is not necessary to devitalize the pulps, but in this particular one the pulp was removed.

In preparing the cavity first grind down the walls of enamel with a carborundum wheel till they are fairly well supported with dentine, after which prepare the cavity with burs to the form shown in Fig. 1, taking care that it is not retentive in shape, filling up undercuts with cement, if there be any. The cavity is then coated with vaseline and an impression taken with cement.



FIG. 1.



FIG. 2.



FIG. 3.



FIG. 4.



FIG. 5.

Place cement impression, cavity surface upward on moldine, imbedding it so that the clay will be about one-sixteenth of an inch from the margin; place one of the rings over it and pour with Melott's metal. You now have an exact duplicate of the cavity in metal. (Fig. 2.)

In swaging the matrix for this class of inlay I use 22-karat gold, silver alloyed, about 32 gauge, as it can be handled freely without fear of bending and can be swaged and burnished almost as easily as pure gold. A stick of a suitable size is then driven into the metal die, making a wood counter. (Fig. 3.) Place gold over and swage; trim to within one-thirty-second of an inch of the margin (which will be plainly marked on the gold), anneal and reswage; then place matrix in tooth and finish the trimming and burnishing. I use carborundum stones and sandpaper disks in finishing the margins, drawing the gold toward the tooth.

After having completed the matrix, place a little whiting, plaster or cement on the floor of matrix to prevent solder from running at that point and reinforce the remaining inside portion with 20-karat solder, after which cut or grind out that portion covered with

whiting; next place matrix in tooth and take compound bite; remove and tack matrix to bite with a little sticky wax, to hold in position, and mount on crown articulators.

The appliance which I employ in handling the Melott's metal, in completing the inlay, I make from a piece of seven-eighths-inch brass tubing, sawing off four pieces about five-eighths of an inch long and splitting all but one, which is used to hold moldine. Two are used to pour the metal into and the fourth is a clamp ring. The object of splitting the rings is to enable them to be removed from the metal freely prior to the swaging. Melott's is used for the die and a composition of Sn. 1, Pb. 1 and Bi. 2 for the counter die.

To proceed with the inlay, carve up the remaining portion in compound, leaving a slight margin the thickness of a calling card, exposing the margin of matrix. Remove the whole from the articulators, by tipping it off with the point of a knife blade, and press carving into ring filled with clay until the margin of matrix shows plainly in the clay. Remove carving and place one of the split rings on clay ring and pour with Melott's; remove while still warm and coat the die with whiting. The warmth from the die will hasten the drying of the whiting. Next place the other split ring inside clamp ring and adjust the two over die ring and pour lower fusing metal, which should be poured as cool as possible. Then swage cusps with wood by first driving the gold into the counter-die, as stated above; partially trim up and finish the swaging with metal die. The shoulder or margin made by leaving a portion of the matrix exposed in the carving will be plainly seen on the swaged piece, giving a perfect line to trim to.

The cusp portion being trimmed and fitted perfectly to the matrix is then reinforced heavily with 20-karat solder, wired to the matrix and soldered with 18-karat, dropping the solder through hole cut out of bottom of matrix. (Fig. 4.) It is then finished up and the retaining grooves or holes are made on side of matrix, under-cuts are made in tooth and then it is set in usual manner.

If each step is carefully followed the results are most gratifying, and you will have a piece of work that will be a credit to yourself as well as a comfort to your patient, doing away entirely with an irritating band at the gum margin.—*Items of Interest.*

The Dental Digest.

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At 2231 Prairie Avenue, Chicago,

Where All Communications Should be Addressed.

Editorial.

TAKE VACATIONS.

If there is any one man that needs a vacation more than any other man, that man is the busy dentist.

There are many reasons for this, the chief one being the very nature of the work itself. The practice of dentistry is, under the best of circumstances, a nerve-racking and wearing pursuit, fraught with worries and responsibilities that consume energy and require force. The close application which a busy dentist usually makes keeps him constantly within the four walls of his office, where he stands day after day, bending and toiling over troublesome and nervous patients, performing delicate and exacting operations. Many a man will say that it is *impossible* for him to get away from his office, believing that the building up and maintaining of a practice demands his constant attention and attendance. Some go so far as to labor into the night, and that for seven days in each week. Such a thing is an awful mistake. No constitution can stand a ceaseless grind for any length of time, and sooner or later a breakdown will occur, resulting in irreparable injury. The former strong, vigorous, happy individual will find himself a weakened, nervous, irritable dyspeptic, whose capacity for work is materially lessened and whose view of life is narrowed to the outlook of the pessimist. The thing most needed to-day in dentistry, in everything, is a simpler, saner, more rational mode of living. The spirit of commercialism has gained such an impetus that it has crept into the professions and all are swept along by the irresistible current of business hustle and competition. All this means enslavement. The system is wrong and must be curbed. Everywhere in the commercial and political worlds about us we see that efforts are being made to

make business and social conditions more sane and reasonable. An entire change in sentiment is coming about and a man's success in life is not to be determined by the amount of money he has gotten, but by the manner of its accumulation. New qualifications are to prevail, love, honesty and a forbearance that will enable a man to better serve his fellow men.

Someone has said that the man who cannot find time for a vacation usually strikes an average by taking time to be sick, and such is the fact in many instances. But there are other reasons, more important perhaps, why a busy dentist should take vacations.

In the first place, a weary and nervous operator can do justice neither to his patient nor himself. Tired and trembling fingers can't execute what is desired and the work in hand must suffer. Careless habits are begotten, a desire to "get through" prevails and the proper rules and standards of practice are ignored.

Again, vacations are necessary, not alone for the welfare of one's physical condition, but for one's mental condition as well. Dentistry, because of its somewhat narrow and confining field, is apt to make men narrow, to put them in a rut, so to speak, and a vacation, spent at a place more or less remote from one's usual surroundings, will furnish new attractions, new ideas and new thoughts, all of which will tend to awaken new interest and broaden one's outlook.

How much better one can work after he comes back from a well-spent vacation! The things that before were laborious tasks are now done with pleasure and satisfaction. The hand is steady, the intellect clear, because the body is free from impurities and poisons, and good red blood is coursing through the veins. Conditions are right for work. To render the greatest amount of efficient service in the shortest time, with the least wear and tear, one must be in the best of health. Nothing is so conducive to health and good feeling as an absolute change from the regular duties of one's employment. The change may be short or long, as the case requires, spent at home or away, with companions or alone, on land or on water, in riding, in driving or in walking, in the country or in the city, at rest or at work, these conditions are of little consequence, but there *must be entire freedom from one's usual duties*. Something *different and unusual* is demanded. Vacations are good investments. Take vacations.

Notices.

INTERSTATE DENTAL FRATERNITY.

The annual meeting of the Interstate Dental Fraternity to be held at the New Kimball House, Atlanta, Ga., has been changed from September 7 to September 17, 1906.

R. M. SANGER, National Secretary.

McLEAN (ILL.) COUNTY DENTAL SOCIETY.

At the annual meeting of the McLean County Dental Society, held June 11, 1906, at Bloomington, Ill., the following officers were elected: President, J. W. Kasbeer; Vice-president, O. J. Jarrett; Secretary, S. S. Powers; Treasurer, J. G. Beasley.

HEAD OF THE LAKES DENTAL SOCIETY.

At the annual meeting of the Head of the Lakes Dental Association, held at Superior, Wis., the following officers were elected for the ensuing year: President, J. G. Findlay; Vice-president, John Malone; Secretary and Treasurer, H. T. Greenlaw, all of Superior.

OHIO VALLEY DENTAL SOCIETY.

The Ohio Valley Dental Society met at Steubenville, May 7, 1906, and the following officers were elected: President, J. W. Storer, Wheeling; Vice-president, C. S. Starkweather, Bellaire; Secretary, W. R. Shannon, Steubenville; Treasurer, W. R. Allen, Steubenville.

OKLAHOMA DENTAL ASSOCIATION.

The Oklahoma Dental Association held its annual meeting at Oklahoma City, May 14, 15 and 16, 1906, and the following officers were elected: President, A. A. Doughty, Oklahoma City; Vice-president, C. A. Cromer, El Reno; Secretary-treasurer, C. L. White, Oklahoma City.

EASTERN INDIANA DENTAL ASSOCIATION.

The thirty-sixth annual meeting of the Eastern Indiana Dental Association was held May 3, 1906, at Newcastle, and the following officers were elected: President, C. B. Meckel, Anderson; Vice-President, H. M. Brown, Elwood; Secretary-treasurer, Charles Kneise, Cambridge City.

INDIAN TERRITORY DENTAL ASSOCIATION.

At the annual meeting of the Indian Territory Dental Association, held May 17 and 18, 1906, at Ardmore, steps were taken to merge the Indian and Oklahoma associations into one body. The following officers were elected: President, S. A. Long, South McAlester; Vice-president, A. E. Adams, Ardmore; Secretary, F. A. Stickel, Muskogee; Treasurer, A. L. Walters, Checotah.

ALUMNI ASSOCIATION OF THE DENTAL DEPARTMENT OF THE UNIVERSITY OF MINNESOTA.

At the annual meeting of the Alumni Association of the Dental Department of the University of Minnesota, held at Minneapolis, June 11, 1906, the following officers were elected: President, Jay Pike; Vice-president, Dr. Wanous; Secretary and Treasurer, Benjamin Sandy.

NEBRASKA STATE DENTAL SOCIETY.

The thirtieth annual meeting of the Nebraska State Dental Society closed May 17, 1906, at Omaha, the following officers being elected for the ensuing year: President, N. H. Morrison, Red Cloud; Vice-president, Horace Warren, Missouri Valley, Ia.; Secretary, M. E. Vance, Lincoln; Treasurer, H. P. King, Fremont.

ARKANSAS STATE DENTAL ASSOCIATION.

At the annual meeting of the Arkansas State Dental Association, held at Fort Smith, May 13, 1906, the following officers were elected: President, R. W. Quarles, Van Buren; First Vice-president, F. A. Skeen, Texarkana; Second Vice-president, R. B. Sadler, Paris; Secretary and Treasurer, H. H. Hopkins, Argenta.

ROCHESTER (N. Y.) DENTAL SOCIETY.

At the annual meeting of the Rochester Dental Society, held May 7, 1906, the following officers were elected: President, L. S. Goble; Vice-president, G. C. Lowe; Secretary, A. E. Sager; Treasurer, J. W. Graves; Librarian, B. S. Hert; Editor, J. Edward Lyon; Curator, C. H. Ward; Censor for three years, F. M. Rudd.

NEW YORK STATE DENTAL SOCIETY.

The thirty-eighth annual meeting of the New York State Dental Society was held at Albany, May 12, 1906, and the officers elected are as follows: President, W. A. White, Phelps; Vice-president, W. S. Rose, Schenectady; Secretary, C. S. Butler, Buffalo; Treasurer, C. W. Stainton, Buffalo; Correspondent, S. L. Goldsmith, New York.

FLORIDA STATE DENTAL SOCIETY.

The twenty-third annual meeting of the Florida State Dental Association was held at Atlantic Beach, Fla., May 16, 17 and 18, 1906, and the following officers were elected for the ensuing year: President, C. F. Kemp, Key West; First Vice-president, T. M. Allen, Jacksonville; Corresponding Secretary, Carroll H. Frink, Fernandina; Recording Secretary, R. B. Taylor, Jacksonville; Treasurer, D. G. Barnett, Arcadia; Executive Committee, L. F. Blalock, Ocala; Frank S. Robinson, Jacksonville; P. D. Hicks, Starke; J. G. Purvis, Lake Butler; A. S. York, Live Oak.

HAMILTON (OHIO) ACADEMY OF DENTAL SURGERY.

The Hamilton Academy of Dental Surgery met June 22, 1906, at Hamilton, Ohio, and the following officers were elected: President, A. T. Good; Vice-president, G. G. Lockwood; Secretary, A. R. Hammerle; Treasurer, W. B. Caldwell.

LAWRENCE (MASS.) DENTAL CLUB.

The Lawrence Dental Club held its annual meeting at Lawrence, Mass., May 16, 1906, and the following officers were elected: President, W. H. Caffey; Vice-president, Charles H. Kershaw; Secretary, William H. Fingleton; Treasurer, Charles H. Frank; Executive Committee, Robert Farquhar, Edward Freeman and William H. Hanrahan.

NEW HAMPSHIRE STATE DENTAL SOCIETY.

The annual session of the New Hampshire State Dental Society was held May 8, 9 and 10, 1906, at Plymouth, and the officers elected are as follows: President, B. F. Sleeper, Portsmouth; Vice-president, J. A. Worthen, Concord; Secretary, F. F. Fisher, Manchester; Treasurer, W. A. Young, Concord; Librarian, E. G. Harvey, Concord.

ALUMNI ASSOCIATION OF THE WASHINGTON UNIVERSITY
DENTAL DEPARTMENT.

The Alumni Association of the Washington University Dental Department held its annual meeting at the college, May 21, 1906, and elected the following officers: President, H. F. Hageman; Vice-president, F. V. Lynott; Secretary, E. P. Brady; Treasurer, W. D. Roddy.

TENNESSEE STATE DENTAL ASSOCIATION.

The thirty-ninth annual meeting of the Tennessee State Dental Association was held at Nashville, May 15, 16 and 17, 1906, and the officers elected are as follows: President, A. A. McClanahan, Spring Hill; First Vice-president, C. A. Sevier, Jackson; Second Vice-president, John R. Beach, Clarksville; Treasurer, Stanley R. Rich, Nashville; Recording Secretary, Charles A. Tavel, Memphis; Corresponding Secretary, R. J. McGavock, Columbia.

SOUTHERN WISCONSIN DENTAL ASSOCIATION.

The annual meeting of the Southern Wisconsin State Dental Association was held May 30 and 31, 1906, at Milwaukee, and the following officers were elected: President, C. F. Rodolf, Muscoda; First Vice-president, B. C. Campbell, Lake Geneva; Second Vice-president, E. H. Weber, Lake Mills; Secretary, C. W. Collver, Clinton; Treasurer, W. G. Hales, Mineral Point. Lancaster, where the association was organized twelve years ago, was selected as the next meeting place.

OREGON STATE DENTAL ASSOCIATION.

The annual meeting of the Oregon State Dental Association, which was held at Portland, closed May 23, 1906, with the election of the following officers: President, G. H. Nottage; Vice-president, A. P. Watson; Secretary and Treasurer, Jean Cline. The members of the new executive committee are Drs. George Marshall, Wadsworth and Holbrook.

LEBANON VALLEY (PA.) DENTAL SOCIETY.

The annual meeting of the Lebanon Valley Dental Society was held at Reading, Pa., May 15 and 16, 1906, and the following officers were elected: President, S. B. Detweiler, Schuylkill Haven; Vice-president, A. W. Rogers, Columbia; Recording Secretary, H. J. Herbein, Pottsville; Corresponding Secretary, P. K. Filbert, Pottsville; Treasurer, C. B. Wagner, Lebanon.

ALABAMA STATE DENTAL ASSOCIATION.

The thirty-seventh annual meeting of the Alabama State Dental Association was held at Mobile, May 8, 9 and 10, 1906, and the following officers were elected: President, Charles L. Gunn, Gadsden; First vice-president, A. T. Reeves, Selma; Second vice-president, George W. Randall, Blockton; Secretary, F. A. Johnston, Sheffield; Treasurer, H. Clay Hassell, Tuscaloosa; Members of the Executive Committee, P. W. Patton, Gainesville; unexpired term caused by resignation, George W. Reese, Birmingham. P. R. Turnstall of Mobile was re-elected as a member of the State Board of Dental Examiners.

SWISS ODONTOLOGICAL SOCIETY.

The twenty-first meeting of the Swiss Odontological Society will be held at Geneva, Switzerland, August 8 and 9, 1906, in connection with the general meeting of the Federation Dentaire Internationale and immediately following it. A number of prominent dentists, members of The Federation and others, have promised their active cooperation. Papers will be read or clinics given by Prof. W. D. Miller of Berlin, Drs. Godon, Platschick and Sauvez of Paris, Mr. Wm. Guy of Edinburgh, Profs. Pont of Lyons, Berten of Munich, Giuria of Genoa, Dr. Guerini of Naples, and a host of others. The official languages will be French, English and German. A special committee of ladies will take charge of the wives and daughters of the members of the congress during the sessions.

A most cordial invitation is extended to all members of the profession, and it is hoped that a large number of our American confreres will embrace this opportunity to visit beautiful Switzerland and include a trip to Geneva in the programme of their summer vacation.

For information please address the undersigned,

PAUL GUYE, D.D.S., President,

12 Rue de Candelle, Geneva.

WASHINGTON STATE DENTAL SOCIETY.

The annual meeting of the Washington State Dental Society was held May 24, 25 and 26, 1906, at Bellingham, and the following officers were elected: President, C. A. Custer, Seattle; First Vice-president, R. A. Munroe Spokane; Second Vice-president, S. I. Moak, Montesano; Secretary, G. T. Williams, Seattle; Treasurer, G. W. Stryker, Everett. The convention will be held next year in Seattle.

SIXTH DISTRICT (NEW YORK) DENTAL SOCIETY.

At the annual meeting of the Sixth District Dental Society, held at Binghamton, May 3 and 4, 1906, the following officers were elected for the ensuing year: President, William J. LeSuer, Oneonta; Vice-president, Frederick W. McCall, Binghamton; Secretary, F. A. Ford, Cazenovia; Treasurer, H. D. Whitmarsh, Binghamton; Board of Censors, M. Hoffman Fish, New Berlin; Frank B. Darby, Elmira; Edwin D. Downs, Owego.

SUSQUEHANNA (PA.) DENTAL ASSOCIATION.

The forty-third annual convention of the Susquehanna Dental Association was held in Allentown, May 25 and 26, 1906. The following officers were elected for the ensuing year: President, Walter H. Fordham, Scranton; Vice-president, E. H. Joachim, Athens; Recording Secretary, E. J. Donnegan, Scranton; Corresponding Secretary, George C. Knox, Scranton; Treasurer, J. C. Hertz, Easton. It was decided to hold the next annual meeting in Scranton.

NATIONAL DENTAL ASSOCIATION.

The next annual session of the National Dental Association will be held in Atlanta, Ga., commencing Tuesday, September 18, and continuing four days. A partial list of the clinics is as follows, and other portions of the program will be published as made ready:

Chair Clinics.

Alabama—Dr. J. H. Crossland, Montgomery, "Stomatic Prophylaxis;" Dr. J. P. Corley, Greensboro, "Teaching the Technique of the Dental Toilet."

Connecticut—Dr. L. C. Taylor, Hartford, "Method of Filling Small Cavities in Children's Front Teeth (10 to 12 years of age)."

Indiana—Dr. J. C. Bryam, Indianapolis, subject not given.

Iowa—Dr. J. V. Conzett, subject not given; Dr. W. R. Clack, subject not given; Dr. F. T. Breene, subject not given; Dr. C. M. Work, subject not given.

Kansas—Dr. F. O. Hetrick, Ottawa, "Gold Filling, Using Combination of Mat and Foil in Mesio-Occlusal Cavity in First or Second Molar."

Missouri—Dr. Wm. Conrad, St. Louis, "Some Uses of Nitrate of Silver;" Dr. H. F. Cassel, St. Louis, "Difficult Partial Impression in Plaster."

New Hampshire—Dr. A. W. Woodman, Plymouth, "Cavity Preparation

and the Insertion of Cohesive Gold or Extraction, Using Somnoform." New York—Dr. N. S. Shields, New York, "The Use of Keeton-Williams Gold in Combination with Cement."

North Carolina—Dr. F. L. Hunt, Asheville, "Porcelain Inlays: Cervical Cavity Restoring Recession of Gum with Pink Enamel;" Dr. I. N. Carr, Durham, "The Real Cohesive Property of Ambler's Cohesive Tin Foil;" Dr. C. W. Regan, Laurinburg, "Cast Fillings, Alexander Method."

South Carolina—Dr. A. P. Fleming, Spartanburg, "Hollow Retentions for Gold Inlays."

Virginia—Dr. F. W. Stiff, Richmond, "Ivory's Crystal Alloy in Conjunction with Watt's Gold."

Wisconsin—Dr. W. H. Cudworth, Milwaukee, "Porcelain Inlay Restoration, Central Incisor;" Dr. F. G. Van Stratum, Hurley, "Restoration of Central Incisor, Using Platinum and Gold."

Table Clinics.

Alabama—Dr. L. G. Pierson, Selma, "An Original Method of Bridge Work Without Showing any Gold;" Dr. J. C. Chisholm, Selma, "Esthetic Bridge Work;" Dr. J. A. Hall, Collinsville, "A Temporary Inferior Denture, or an Emergency Set of Lower Teeth."

Connecticut—Dr. F. T. Murlless, Jr., Windsor Locks, "The Use and Manipulation of Guttapercha."

District of Columbia—Dr. L. T. Davis, Washington, "Use of Vulcanite Pinless Teeth in Crown and Bridge Work;" Dr. H. P. Dawson, Washington, "Method of Lateral Bicuspid Attachment in Bridge Work, Preserving the Buccal Wall;" Dr. S. Jaffe, Washington, "A Method of Utilizing a Live Bicuspid in Bridge Work Without Showing Gold;" Dr. H. Porter Davis, Washington, "Refining Gold Scraps in the Dental Office."

Georgia—Dr. J. H. Lorenz, Atlanta, "Inlays and Hoods for Bridge Abutments."

Kansas—Dr. W. A. Coston, Topeka, "Porcelain;" Dr. A. Lehrman, Kansas City, "A Method of Knowing if the Bite Is Correct—Absolute."

Louisiana—Dr. S. H. McAfee, New Orleans, "Removable Facing for Crown and Bridge Work."

Massachusetts—Dr. Chas. E. Parkhurst, Somerville, "Gold Inlays and Splints for Loose Teeth;" Dr. A. W. Doubleday, Boston, subject not given.

Missouri—Dr. D. O. M. LeCron, St. Louis, "Cavity Preparation for Gold and Porcelain Inlays, Showing Plaster Models;" Dr. F. Webster, Carthage, "Crown and Bridge Work;" Dr. D. J. McMillen, Kansas City, "Bandless Metal Crown;" Dr. D. D. Campbell, Ozark, "Contour Gold Inlay, 'Two Hours Saved;'" Dr. E. P. Dameron, St. Louis, "Use of Interchangeable Facings."

New York—Dr. R. Ottolengui, New York, "Artificial Velum;" Dr. V. H. Jackson, New York, "Orthodontia—Jackson System;" Dr. M. C. Tracey, New York, "New Ideas in Porcelain Crowns."

North Carolina—Dr. J. A. Gorman, Asheville, "Table Clinic Orthodontia."
 Pennsylvania—Dr. J. A. Libbey, Pittsburg, "Removable Saddle Bridge
 with Gold Inlay Abutment and Rubber Attachment."

Texas—Dr. R. W. Carroll, Beaumont, "An Original Method of Making
 a Porcelain Faced Crown."

Surgical Clinic.

Wisconsin—Dr. B. G. Maercklein, Milwaukee, "Cleft Palate, Hare Lip
 or Operation on Antrum."

A number of sources have not been heard from up to the present date,
 but it is confidentially expected that by the time of the meeting the num-
 ber of clinicians will be more than doubled.

THOS. P. HINMAN, *Chairman.*

CHAS. L. ALEXANDER, *Secretary.*

LATEST DENTAL PATENTS.

- 818,661. Crown and bridge work, Arthur H. Brown, Hamilton, Mo.
- 819,001. Package-roll of metallic leaf, Walter H. Coe, Providence, R. I.
- 818,940. Saliva ejector, Henry S. Davis, San Francisco, Cal.
- 819,641. Dental plate machine, Wm. S. Filley, Montpelier, Ohio.
- 819,136. Tooth-spreader, John E. Herman, Sandusky, Ohio.
- 819,137. Dental Matrix-retainer, John E. Herman, Sandusky, Ohio.
- 819,249. Dental filling, Frederick C. C. T. A. Osius, Muskegon, Mich.
- 819,678. Dental waste cotton receptacle, Bert G. Simmons, New Brun-
 swick, N. J.
- 820,045. Dental vulcanizer, Valentine A. Gudex, Milwaukee, Wis.
- 820,025. Electric dental furnace, Daniel G. Steinecke, New York.
- 820,474. Mandrel for dental engines, Wm. C. K. Buchanan, Kansas City,
 Mo.
- 820,781. Suspended electric dental motor, John F. Hammond, Brewster,
 N. Y.
- 820,717. Gold-leaf book, Robert Henke, Jr., New York, N. Y.

News Summary.

STEPHEN V. SHEA, a young dentist of Brooklyn, N. Y., died May 30,
 1906.

HYMAN ROOSA, 58 years old, a dentist of Kingston, N. Y., died June 3,
 1906.

DANA I. JOCELYN, 75 years old, a dentist of St. Louis, Mo., died June
 10, 1906.

C. W. MILLER, formerly a dentist of Toledo, Ia., died recently at Excel-
 sior Springs.

EDWARD L. HAMLIN, 65 years old, a dentist of Waltham, Mass., died June 13, 1906.

ROBERT L. REYNOLDS, 83 years old, a dentist of Amsterdam, N. Y., died June 11, 1906.

CHARLES WESLEY STANTON, 67 years old, a dentist of Buffalo, N. Y., died June 6, 1906.

DR. McLESKY, formerly a dentist of Lamar, Mo., died at Springfield, Mo., early in June, 1906.

EDWARD M. WILLIAMS, formerly a dentist of Broadway, Va., died of pneumonia, June 10, 1906.

A. S. CUTLER, 67 years old, formerly a dentist of Kankakee, Ill., died at Rockwood, Tenn., June 11, 1906.

S. B. CALDWELL, a dentist of Wheeling, W. Va., fell from a steamer on the Ohio River and was drowned, June 6, 1906.

DISSOLUTION OF PARTNERSHIP.—Drs. Barney and Strongquist, dentists of Newport, Ind., dissolved partnership June 13, 1906.

WHOSE PAINS?—On the windows of a London dentist's office appears this announcement: "Teeth extracted with great pains."

T. T. THAXTON, a dentist of Pratt City, Alabama, was recently shot and killed in Birmingham while endeavoring to act as peacemaker between a man and his wife.

JAMES F. WARK, 30 years old, a dentist of Cleveland, O., died of paralysis and complications through puncturing his finger beneath the nail with a dental instrument, June 10, 1906.

DIVORCES.—Mrs. Grace Wassall was granted a decree of divorce at Reno, Nev., June 8, on grounds of desertion, from her husband, Joseph W. Wassall, a dentist of Chicago, Ill.

TO STERILIZE HYPODERMIC NEEDLES.—Immerse the needle in alcohol and pass it over an alcohol flame; the alcohol will burn out, causing the needle to become aseptic and dry.—*Dental Quarterly*.

PERSEVERANCE.—Brilliance will often fall short of high attainment where ability of a lesser order will succeed through the sublime attribute of plodding.—C. N. JOHNSON, Chicago, in *Dental Review*.

ANCIENT HISTORY.—Don't extract a tooth until every effort has been made to save it. The day of universal extraction belongs to ancient history.—DR. C. P. HASELDEN, Hamburg, Germany, *Dental Brief*.

ALCOHOL OR CHLOROFORM, VS. ADRENALIN IN COCAIN SOLUTIONS.—It is found that cocain dissolved in alcohol or chloroform acted better than when dissolved in adrenalin.—MR. GREIG, London, Eng., *Dental Record*.

PROTECTION FOR FACINGS.—To prevent "etching" of facings when using 20 per cent platinum solder, paint the surface with a creamy solution of carbonate of magnesium before investing.—A. E. MATTESON, Chicago, *Dental Review*.

FATALITIES.—Early in June a girl of Chicago, Ill., had a tooth extracted, stomach trouble and blood poisoning followed, and two weeks after the dental operation she died in hospital.—June 11 a dentist of Muskogee, I. T., accidentally shot and killed his wife.

ENOUGH SAID.—Passer-by—"Is that your pork down there on the road, guv'nor?"

Farmer—"Pork! What d'ye mean? There's a pig o' mine out there."

Passer-by—"Ah, but an automobile just went by."—*Punch*.

TREATMENT FOR CANKER SORE MOUTH.—I have found the full strength aromatic sulphuric acid almost a specific for this condition. I prescribe internally tincture of ferric chlorid gtt. v.; potassium chlorate gr. iii.; water $\frac{1}{2}$ oz. every three hours in lemonade.—J. E. POWER, *Tri-State Dental Journal*.

ADVANTAGE OF THE GOLD INLAY OVER THAT OF PORCELAIN.—The gold inlay has one marked advantage over the porcelain in that the matrix become a part of the inlay, giving it an exact adaptation to the cavity, therefore requiring the minimum of cement.—JOSEPH W. WASSALL, *Items of Interest*.

FIRES.—C. F. Stewart, Oklahoma City, June 8; loss \$300.—Charles W. Shurtleff, New Bedford, Mass., June 10; total loss.—John T. Hayes, Nashville, Tenn., June 11; damage of several hundred dollars, all covered by insurance.—Drs. Clifton and Bray, Waco, Tex., June 18; heavy loss, covered by insurance.

TO REMOVE AN IMPRESSION.—When taking an impression for full superior denture, if it is found difficult to dislodge, have the patient close the lips and blow real hard so as to distend the cheeks and the impression will drop down, no matter how tight it may have been.—R. C. TRAYNHAM, *Practical Dental Journal*.

FOR ROUGH HANDS.—Take a four-ounce bottle and put in same three ounces of glycerin, one ounce alcohol, and from twenty to thirty drops of carbolic acid. After washing the hands and while they are little damp apply a few drops and thoroughly rub in. A good time to use it is at night.—*American Dental Journal*.

LOOK BEFORE YOU LEAP.—A dentist was examining a young lady's teeth. When she took the chair she said, "Now, don't hurt me." "All right, little girl," said the dentist. She was angry in an instant and said, "Do not call me a little girl!" "Excuse me; I would not have called you a little girl had I looked in your mouth first," said the dentist.

ICHTHYOL FOR INFLAMMATORY AND SEPTIC CONDITIONS.—Ichthyol is a most valuable substance to reduce inflammatory swelling and in septic conditions affecting the skin. Its disagreeable odor is very distressing to many patients, but it can be concealed by the addition of oil of citronella, 20 minims to the ounce of ointment. Oil of roses also does well, but is very expensive.—*Med. Standard*.

RETENTION BANDS.—There is an objection to too many bands, especially among young ladies, but it must be remembered that teeth drawn inward or outward and downward and rotated have a tendency to separate and move outward and rotate again; therefore the best means of retention is preferable to regulating again.—Dr. J. N. McDowell, Chicago, *American Dental Journal*.

GOOD DOUGH.—A young bookkeeper, recently married, carefully laid down a piece of bread the other night, and said to his wife: "I wish you could make bread such as mother used to make." The young wife smiled and remarked: "Well, John, I wish you could make the 'dough' that father used to make." A hush as silent as death fell over the household."

HARMONY LINES.—When you are obliged to make a filling, for whatever reason, and you have decided to make a gold filling, I wish to make a plea for study in harmony in lines, so that the only thing that will violate the esthetic sense will be the contrast in color between the gold of the tooth surface, and that is not always a painful contrast.—Dr. T. E. Weeks, *Dental Review*.

DENTAL SOCIETY AS EDUCATOR.—During my short career as a dentist I have found the dental society one of the greatest factors of dental education of modern times; the life of the society being practically founded upon that beautiful thought formulated in the "Golden Rule," which, when sifted down to the dental society, can be spoken in one word, ethics.—J. K. Conway, *Kansas City Dental Journal*.

A HICKORY SPATULA.—The glaze of a glass cement slab being removed, giving a slightly roughened surface, the fine fiber of a hickory spatula permits a mill-stone grind to the mixture of powder and liquid, insuring the breaking apart and turning over and around of all cement particles, giving a more even mixture and securing a more perfect chemical union, with no discoloration.—D. R. Phillips, *Northwestern Dental Journal*.

INSERTING WIRE LIGATURES.—Give a well-developed curl to the end of the wire ligature before you attempt to insert it between the teeth and be sure that the end has no hooks or snarls, then you will have no puncturing of the gums and cause no real pain to your patient. The curl should be inserted so as to make the ligature tend to return toward the point of insertion and away from the gums.—V. E. B., Cleveland, *Dentist's Magazine*.

AVOID SPEAKING ILL OF FORMER PROFESSIONAL ADVISERS.—A strict observance of ethical principles would not permit any practitioner to encourage patients to make a change in their professional advisers, but if such patients have not been well served, and really need more skillful service, there is no reason why a change should not be allowed. Even in such cases, however, it is only the part of prudence and good taste to avoid speaking ill of the former practitioner or of criticising his work.—S. H. Guilford, *Philadelphia, Pa.*

METAL SPRINGS FOR REGULATING.—After carefully considering the different means of causing force in regulating I adopted the metal spring, for by its use force is applied for a longer period without interference or change of form than by methods generally employed, patients usually being seen but once a week. The degree of force to be exerted is governed by the size of the spring employed.—Dr. V. H. JACKSON, New York, *Cosmos*.

THE DENTIST'S ASSISTANT.—He was ten years old and had gone to the dentist's to get one of the last "milk teeth" extracted. When the operation was over, he said to the dentist:

"Well, we made a good job of that, didn't we?"

"We?" replied the dentist. "Why 'we?' What did you do?"

"Why, I held the socket while you pulled the tooth, didn't I?"—*New York Globe*.

AN EGYPTIAN TOOTH BRUSH.—The native Egyptians universally use, for cleaning their teeth, a twig of wood, frayed at one end to form a brush. The wood comes from a tree known in Arabic as Al-Arak, and has been used by the natives for cleaning their teeth since the year 3000 B. C. It possesses rare medicinal properties, which are very beneficial to the gums, and its natural aromatic odor makes its use most agreeable.—*Rochester Times (Brief)*.

IMPORTANCE OF REGULAR ATTENTION TO CHILDREN'S TEETH.—As the recuperative power of the dental tissues is null, and as premature extraction will bring permanent disfigurement, it is absolutely necessary that we should be able to interfere before any permanent damage is produced, and to oppose with all the means at our command those disorders which intelligent care would often prevent.—EDMOND ROSENTHAL, D.M.C., Brussels, Belgium, *Dental Brief*.

"HAND-ME-DOWN" CROWNS.—Not one thing to-day is doing crown and bridge work, that intricate union of operating room and laboratory, greater harm than these "ready-made," "hand-me-down" crown methods; shells made on composite sizes like shoes; seamless systems no end; "fit guaranteed and crown on in twenty minutes;" crowns constructed from plaster casts shipped to the wholesale laboratory man who advertises: "Let us do your work while you sleep, six thousand bridges made last year, see our testimonials."—CLARENCE J. GRIEVES, *Dental Summary*.

MUNICIPAL DENTISTRY FOR CITY OF CLEVELAND.—The city will add dentistry to the benefactions it gives the poor. Within a fortnight a dental chair will be established in connection with the outdoor relief work of the city infirmary. The city will buy all the material and equipment. The work will be furnished by the Cleveland Dental Association, and 1,500 children, whose parents receive aid from the city, will be entitled to free treatment. The reasons given for the innovation is that the digestion, and consequently the health, of the children will be improved by good teeth.—*Daily Paper (Summary)*.

WHY PORCELAIN CHANGES COLOR IN FUSING.—The changing of the color in the mass, to my mind, is due more to the movement in the molecules in the mass than it is to the burning out, and when the temperature is raised the molecules are changed and the coloring matter sinks or gravitates toward the center under high pressure, the tendency of the mass being to globulate. This is true of changes that take place in the inorganic world.—G. W. COOK, *Chicago*.

GOLD INLAY.—The following method of making a gold inlay in the occlusal surface of a molar was recently demonstrated by Dr. W. O. Fehman. After placing matrix of gold roughly, he packed it full of moss-fiber gold, and, removing the mass, flowed solder over the gold. He then replaced the inlay, readapted to the margins with burnishers, and flowed the solder to proper contour. With due care investment is unnecessary.—*Northwestern Dental Journal*.

TOOTH MOVEMENT.—Tooth movement most largely occurs through actual bending or springing of the bony tissues, coupled in most instances with actual and rapid development of all the osseous with which the teeth are connected. This further emphasizes the necessity of operating at a time when osseous growth is naturally occurring and when it may be stimulated and promoted by the intelligent application of force to the teeth.—DR. W. J. BRADY, in *Western Dental Journal*.

COLLECT YOUR BILLS.—Patients who owe bills which are past due, if in need of further dental services, will seldom go to the dentist whom they owe to have it done, even when they expect to pay for that particular work. But when they are forced to pay the old bill they are as likely to return for further work to the original dentist as to go elsewhere; more likely, if the work has been satisfactory, and work which has been paid for is usually the most satisfactory.—H. G. LOGAN, *Aurora, Ill.*

AN EXTRACTED TOOTH THE PATIENT'S PROPERTY.—Is a tooth that has been extracted the property of the dentist or the patient? The courts in Germany have just decided that the tooth still belongs to the man after it has left his jaw. The dentist contended that a tooth evicted from occupancy with the full consent of its landlord became ownerless and derelict, and as the particular tooth in question was curiously shaped, he proposed to keep it. But the patient also wished to have it. And the patient has won.—*Schenectady Star (Brief)*.

BRAZIL SAID TO BE A GOOD FIELD FOR DENTISTS.—Dr. Maria Antoinetta Ghekiere, the only woman dentist in Rio de Janeiro, Brazil, has recently been in New York. According to Mrs. Ghekiere's statement, Brazil is a great field for dentists. There are only a few there, and the prices paid are extremely high. For extracting a tooth Mrs. Ghekiere charges \$6.50, without gas, and not less than \$50 with gas. An ordinary gold filling costs \$10 to \$12, gold crown about \$50. Mrs. Ghekiere is traveling partly for pleasure, partly to study American methods of dentistry. She intends to spend the summer in Europe.—*Summary*.

FISH BONE CAUSES TOOTHACHE.—A lower molar tooth was extracted for periostitis, and on removal a fine bristle, like bone, was found projecting from the apex of the root. It turned out to be a fish bone, and probably one of those fine bones found in whiting. This had set up inflammation, but, of course, it was impossible to diagnose the true cause of inflammation. The fish bone was in situ and had not been disturbed in extracting the tooth. It must have passed down the pulp chamber and through the apex of the root.—*Record*.

TREATMENT OF SHALLOW EROSION CAVITIES.—In sensitive superficial cavities due to erosion or abrasion, warm solutions of trichloroacetic acid in full strength applied two or three times, the cavity being dried between applications, will often enable one to penetrate to sound, non-sensitive dentin, after which the cavity may be prepared as desired. This procedure possesses real merit, and is beneficial in many cases. In all these cases, sharp burs are essential to secure the minimum of suffering to the patient.—*GEORGE GOW, Dominion Dental Journal*.

TREATMENT OF PATIENTS.—We are well aware that the majority of patients enter the dentist's apartments with much fear and trembling, and he who can receive them in such a manner as to quiet their fears, which are often largely in their minds, by the time he is ready to begin the work, has taken a long step toward a successful operation, and in the building up of a practice such a one will be far more successful, though lacking in fine mechanical ability, than he who, being the finest of mechanics, is devoid of such tact or ability to understand human nature.—*H. G. LOGAN, Aurora, Ill.*

TO ELECTRO GILD ORTHODONTIA APPLIANCES.—Make a solution by dissolving ammonium carbonate and potassium cyanid, one ounce of each, in one pint of rain-water. Attach the appliance to the zinc pole and a piece of pure gold to the carbon pole of any form of cell battery. Place the solution in a porcelain pan over a low flame, allowing it to boil slowly. Keep the appliance and gold in the solution from ten to fifteen minutes. The appliance will come out with a dark brown color, but after brushing it with a stiff brush filled with sodium bicarbonate, it will have a rich gold color.—*J. Q. BRYAN, Indianapolis, Dental Review*.

ROBBERIES.—*Dr. Seals, Grand Island, Neb., May 30; \$75.—Dr. Rathbun, New Hampton, Ia., June 4; \$50.—J. H. Kennedy, Morrison, Ill., June 6; \$35.—J. M. King and E. T. Jones, Bristol, Tenn., June 8; \$300 and \$20, respectively.—Dr. Thill, Dubuque, Ia., June 7; \$25.—A. B. Dorland, W. A. Dorland, S. E. Dodson, W. A. Rawson, and Dr. McMillan, Grand Rapids, Mich., June 9; a total loss of about \$1,000.—F. L. Cary, Zanesville, O., June 10; \$50.—Dr. McClure, Columbus, O., recently had stolen \$5 worth of instruments.—Dr. Barney, Prairie du Chien, Wis., \$20.—R. H. Dixon, Whitewater, Wis., early in June; \$70.—Drs. Butler and Lovitt, June 11; \$100.—William Morris, Manitowoc, Wis., June 17; \$20.*

SMUGGLED DENTAL BURS SOLD BY GOVERNMENT VERY CHEAPLY.—Deputy Marshal Conkling sold at public auction 1,000 dozen dental burs and drills which had been seized by the customs officers last May. The goods were found at the home of Dr. Richard Kessel, a dentist, and he was arrested. The drills were smuggled from Canada, via Bridgeport. Martin J. Cook got the lot for \$265. There is a duty on these goods when, imported from Germany, where they are made, of 45 per cent ad valorem, so that it is said what brought only \$265 at auction can be sold for about \$1,000 in the open market.—*Buffalo Express (Brief)*.

ACCIDENTS.—Lee R. Pittinger, a dentist of Boston, Mass., was bitten by a dog thought to be mad, June 14, which necessitated his seeking treatment at the Pasteur Institute, New York, for fear of hydrophobia intervening.—Lawson D. Wood, a dentist of Grand Rapids, Mich., and his wife and family narrowly escaped death by ptomaine poisoning through eating cheese, June 16.—W. C. K. Buchanan, a dentist of Kansas City, fell from a car and was rendered unconscious, June 11.—A man of Coleman, Wis., swallowed a set of artificial teeth during his sleep, June 2, which necessitated his removal to hospital for operation.

"SCRAP PILE WANTED."—Under the heading, the "Scrap Pile," I desire to make a suggestion regarding raising a fund for San Francisco sufferers. From my experience during the last few weeks, the task of acquiring a sum sufficiently large to materially assist those in need is a difficult one, and the "Scrap Pile" idea evolved from the ease with which a goodly sum was collected in Kansas City a year ago for an event of minor importance, by simply requesting all asked to donate a portion of their gold scraps, several hundred pennyweight soon accumulated. Now, let every dentist, regardless of the fact whether or no he has paid into other funds, box up at least a portion of his gold scraps and send them to any dental journal, or to Dr. J. D. Patterson, of Kansas City, Mo., Keith & Perry Bldg., Treasurer of National Relief Committee, and further assist those in distress.—J. P. Root, Kansas City.

ACTION OF STATE BOARD ILLEGAL.—That the State Dental Board of Wisconsin illegally determined that the Dental Department of the Milwaukee Medical School was disreputable is the decision of the Supreme Court in the action brought by the college against the board. The decision of Judge Tarrant in the certiorari proceedings brought by the college when the board refused to grant certificates to seven members of the graduating class of 1905 to practice dentistry in Wisconsin was the decision handed down by the Supreme Court March 20. As a result of this decision it is possible that further proceedings may be instituted against the dental board and its members by the Milwaukee Medical College, it having been alleged throughout the proceedings that the action of the dental board caused great loss to the dental college. Dr. Henry L. Banzhaf, dean of the school, announced six months ago that it was the intention of the college to go as far as the law would permit.—*Dental Brief*.

FOOD REQUIRED.—A most interesting fact and one not generally known is that the amount of food required depends largely upon the skin surface, as the object of taking food is to maintain animal heat, which is chiefly lost through the skin. A man weighing 180 pounds has a skin area of twenty-one square feet, while a child weighing ten pounds has a skin surface of three square feet, and needs only one-seventh of the food required by the man of 180 pounds. The man who perspires freely, whether working indoors or out, on account of the rapid evaporation through perspiration, requires more food than one who perspires very little.—T. ELHANAN POWELL, *Chicago*.

A DENTAL BILL IN COURT.—The dentist who presented a bill to Prince Louis of Battenberg for \$1,000 for repairs to his teeth has been outdone. Suit has been brought in the City Court against Mrs. Jennie Wheeler, an artist, whose patrons are wealthy society people, to recover a balance of \$1,305 alleged to be due Dr. Robert E. Payne, a dentist at Fifth avenue and Thirty-fourth street, on a bill for \$1,505, for three weeks' work on her teeth. Mrs. Wheeler has refused to pay, asserting that the price was to have been \$500; that the work was unskillfully done, and that she objects to paying \$15 an hour for professional services when they were taking lunch together, and \$52.50 a day on occasions when she failed to appear at his office for treatment.—*New York Journal*. (Brief).

SUCCESSFUL BUSINESS METHODS.—To make your business a successful one be systematic in everything you do—in your bookkeeping, in your records of services rendered; in fact, everything that pertains to your daily routine of work. Do not do things in a slipshod manner. Be punctual. If you have certain hours for business—and you should have—be there; not fifteen minutes later, but exactly upon the dot. Make your appointments and be on hand to keep them.

Be a man alive to the best interests of the community in which you live. Be bright and cheery, greeting everybody with a pleasant smile. These, together with hard work and perseverance, will make your profession a most successful one, and of which you may well feel proud.—S. A. HELCK, *Grayville, Ill.*

TO CONTROL SALIVA.—An annoying operation to successfully perform is filling a lower third molar that cannot, for half a minute at a time, be kept free from saliva. Such a case presented in a young lady of highly nervous temperament, whose flow of saliva was excessive. Placing of the dam was impracticable, and napkins placed in the mouth would almost immediately become saturated. This annoyance was overcome through the action of atropin sulfate, a dose of which (1-120 grain) I had her take three-quarters of an hour before her next appointment. At that time I found the mouth very dry, though not uncomfortably so for the patient. This salt of atropin has a much better effect on the secretion than the ordinary alkaloid. Its manifestations last from four to five hours.—H. OTIS LOCUE, *Stomatologist*.

ORTHOFORM FOR SORE GUMS.—Give your patient who has had a new plate made a small envelope with a little orthoform in it to use on the plate where it makes the gums sore. This will remove the soreness. Make it a point to see such cases every day for a few days. A little trimming at the right time saves much discomfort and many sore mouths. If a plate tips loose at one side, examine the occlusion on the opposite side and grind the buccal cusps until the lingual cusps occlude the harder. On either side have the lingual cusps occluding slightly harder than the buccal in platework. Do not put teeth beyond ridge if it can be avoided.—**DR. H. W. McMILLAN, Tri-State.**

BUSINESS COMMITTEES' SUPPLIES.—Who has not heard the cry at a dental meeting: "Where's the blackboard?" "Anybody got a piece of chalk in his pocket?" "If I had a tack or pin, Mr. President, I could hang this chart where it might be seen to advantage." But the blackboard has been left in somebody's attic, no good man goes about loaded with chalk, tacks are not thought of, and the pin that comes to the rescue is pointless and badly bent. Some things ought not to be; these are of those. Wherefore, let the chairman of the business committee, or the man who attends to his business for him, provide for all possible needs of those who may take part in the doings of the society.—**D. O. & L.**

FLIES AND TUBERCULOSIS.—Dr. Frederick T. Lord of Boston reports in the *Clinical Contributions* of the Massachusetts General Hospital a series of experiments to demonstrate the role of flies in the dissemination of tuberculosis. His conclusions are (1) that flies may feed on tubercular sputum and excrete living bacilli which remain virulent for two weeks, or longer. (2) That human beings are in danger of eating food defiled by fly specks. If these fly specks are mechanically disturbed they may infect the air with tubercle bacilli.

He suggests that all tubercular material should be carefully protected from flies, that rooms and hospital wards containing tubercular patients should be well screened during fly season, and that all foodstuffs should be well protected from flies to guard against possible infection.—*Dietetic and Hygienic Gazette (Dentist's Magazine).*

FUSING PORCELAIN.—The following deductions are from experiments:

1. That porcelain has no definite fusing point.
2. By prolonging the time of exposure to heat a thoroughly fused porcelain may be obtained at a comparatively low temperature.
3. That porcelains fused at a lower temperature for a long time will maintain their characteristic color.
4. That low-fusing porcelains can be made of high-fusing porcelains by repeated fusing and grinding.
5. If a piece of porcelain is thoroughly fused and more porcelain added and fused, the first layer will be slightly over-fused.
6. That porcelains containing a large percentage of flux are affected more by bubbles than those that are more nearly composed of the basal ingredients.—**J. Q. BYRAM, Indianapolis, Ind., Review.**

OCCCLUSION FOR BRIDGES.—In studying occlusion for a bridge, we must remember that the life of the bridge is the life of its weakest anchorage. In a bridge supported by two teeth, one multi-rooted and the other single-rooted, both in the same condition of health, if forces of mastication bear equally on each tooth, the single-rooted one will loosen first, even if the force were not applied at an angle to the long axis, as it usually is in single-rooted teeth. Hence, it follows that if you favor that tooth at the expense of the other in the arrangement of occluding surfaces, you will have increased the reasonable life of the appliance. We must bear in mind the several different phases of masticatory force.—S. H. VOYLES, *Dental Brief*.

STEP ANCHORAGE AND ITS INDICATIONS.—We are seldom, if ever, justified in placing a filling in the approximal surface of a bicuspid or molar where the occluding tooth is in position and the occlusion is normal, without securing it by a step anchorage cut at a right angle to the pulpal wall into the occlusal fissure. If this is done, and the step is cut sufficiently broad and deep, making that portion slightly broader at the end farthest from the cavity, there will seldom be any movement of the filling in the cavity, but care must be exercised in preparing the step to make it sufficiently deep and broad to insure sufficient filling material to prevent its stretching or breaking by the force of occlusion in the course of mastication.—J. F. WALLACE, *Dental Era*.

GUERINI'S HISTORY OF DENTISTRY.—The following extract from a circular issued by the committee of which Dr. Chas. McMann, of Hartford, Conn., is chairman, invites attention to a matter that should deeply interest dentists who read:

"At the Buffalo meeting of the National Dental Association, the Committee on History of Dentistry reported to the Association that Dr. Vincenzo Guerini, of Naples, Italy, had written a History of Dentistry from the earliest times down to the beginning of the Nineteenth Century, which work is in the hands of the Committee, having been translated into English and fully revised and edited. Dr. Guerini has generously placed the publication of this great work under the patronage of the National Dental Association in token of his appreciation of American dental development. In order that the work may be published without financial loss, it is necessary that about 700 subscriptions or copies at \$5.00 each be obtained before contracts for printing, binding and publishing the work can be entered into, and the duty of securing these advance subscriptions has been assigned to the Committee on History of Dentistry of the National Dental Association.

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"In case this proposed publication meets with the success which it merits, a second and companion volume, treating of the more modern aspect of dentistry, will probably be issued under the same auspices and conditions."

Subscriptions should be sent to Dr. Chas. S. Butler, Buffalo, N. Y., who may also be addressed for further information in regard to the proposed work.

STERILIZATION OF INSTRUMENTS.—As to the sterilization of instruments, forceps, knives, clamps, etc., I use a sterilizer made of copper. It is practical and inexpensive. All instruments which have been used are taken to the laboratory. Those smeared with blood and pus are thoroughly scrubbed with a brush and soap, and are placed in the sterilizer which contains about a quart of water and a little sodium-carbonate, to prevent the instruments from rusting. They are then boiled for twenty minutes. This process insures perfect sterilization. Engine burs and broaches are cleaned with a rapidly revolving wire brush, and then placed in pure carbolic acid, to remain there until needed. They can then be washed in water and dried with a napkin.—E. M. KAPITAN, *Dental Review*.

MARRIAGES.—J. E. Anderson, a dentist of Paton, Ia., was married to Miss Iva Waterbury, June 12.—Ralph Ankeny, a dentist of Marseilles, Ill., was married to Miss Jessie Yuill, May 29.—Harmon C. Bloodworth, a dentist of Charleston, Miss., was married to Miss Eurie Peterson, June 20.—A. E. Bronson, a dentist of Lewis, Ia., was married to Miss Pattison of Waterloo, June 19.—Chauncey Brooks, a dentist of Milford Center, O., was married to Miss Lillian E. Wood of Richwood, O., June 7.—John O. Butler, a dentist of Buchanan, Mich., was married to Miss Agnes Slocum of the same town, June 10.—Earle Van Zile Cutler, a dentist of Osage, Ia., was married to Miss Mabelle Wilson, June 7.—Guy Dillon, a dentist of Detroit, Mich., was married to Miss Etta Fleischer of Normal, Ill., June 20.—W. L. Dunning, a dentist of Ottumwa, Ia., was married to Miss Madge Pettit of Oskaloosa, Ia., June 27.—George Lewis Engel, formerly a dentist of Minonk, Ill., was married to Miss Anna Josephine Stretke of Chicago, Ill., June 5.—E. R. Griswold, a dentist of Dansville, N. Y., was married to Miss Lurinia Mary Crane, June 18.—G. E. Harrington, a dentist of Marshfield, Wis., was married to Miss Hattie Mathews of Poysippi, June 1.—Walter Keehl, a dentist of Iowa City, was married to Miss Sylvia Duncan of Bancroft, Ia., June 16.—George L. S. Kennedy, a dentist of Villa Grove, Ill., was married to Miss Kathryn Rehling, also of Villa Grove, June 22.—Joel Stephen Lightner, a dentist of Ellaville, Ga., was married to Miss Bessie Lou Sears of Ellaville, June 14.—James McClain, a dentist of Marion, Ind., was married to Miss Ada Burley of Huntington, Ind., June 17.—A. I. McCord, formerly a dentist of Hamburg, Ia., was married to Miss Hall of Hamburg, June 6.—Maurice S. Matthias, a dentist of Galion, O., was married to Miss Bertha Sarah Reisinger of Galion, June 5.—Clark Mertz, formerly a dentist of Belaire, O., was married to Miss Helen Sanders of Moundsville, Va., June 30.—Edward D. Rank, a dentist of Tower City, Pa., was married to Miss Kopp of Tower City, June 12.—Joseph Satory, a dentist of St. Cloud, Minn., was married to Miss Elizabeth Franke of St. Cloud, June 12.—Emory Schultz, a dentist of Storm Lake, Ia., was married to Miss Glea Wolfe of Iowa City, June 12.—William Livingston Shipman, a dentist of Worcester, Mass., was married to Miss Fannie Elouise Hamilton of Worcester, June 12.—William Everett Spence, a dentist of Iowa City,

Ia., was married to Miss Mary Hoar of Iowa City, June 12.—Hubert Stoddard, a dentist of Knox, Ind., was married to Miss Myrtle Talbert of Knox, June 5.—George W. Tarr, a dentist of St. Cloud, Mo., was married to Miss Estelle Elden of Alton, Ill., June 5.—Philip R. Thomas, a dentist of Hibbing, Minn., was married to Miss Ellen Powell of Defiance, Ia., June 14.—Arthur M. Tummel, a dentist of Chicago, Ill., was married to Miss Bessie Stephens of Dubuque, Ia., June 5.—D. P. Twigger, a dentist of Shamokin, Pa., was married to Miss Marie Shoener of Shamokin, June 6.

DENTAL CLINICS FOR SCHOOL CHILDREN.—At a meeting recently held at Bellevue Hospital, Manhattan, was read a letter from the New York Association for Improving the Condition of the Poor, asking Dr. John W. Brannan if it would not be possible for Bellevue and allied hospitals to give efficient dental care to the school children of the city. The matter, after considerable discussion, was referred to a committee, which will investigate the need and expense of establishing a dental clinic. The need is widespread, as is understood when one realizes that 55,300 school children were examined from March to December last year, and 18,000 were found to have defective teeth. The percentage of children needing dental care was doubtless greater, as a medical examiner frequently fails to discover conditions that a dentist would see. The doctors in the Board of Health are greatly in favor of dental care for the school children, but all feel that it must be done under legitimate supervision. They claim that dental care is every bit as necessary as vaccination and the precautions taken against tuberculosis. The same doctors know that in many cases of aching teeth brought to the attention of physicians in medical clinics extractions are made when, by proper care, the teeth could be saved.—*Brooklyn Union (Brief)*.

OPENING FOR DENTISTS.—From the following we would judge that German cities present excellent opportunities for the American dentist. Consul F. S. Hannah, of Magdeburg, reports that investigation as to the number of practicing dentists in the city of Magdeburg as well as in the entire province of Saxony shows a decidedly small number in proportion to the population, especially as in recent years the Germans are coming to realize more and more the importance of caring for the teeth. Magdeburg, with nearly 250,000 inhabitants, at the present time shows only 21 practicing dentists, one of whom—a lady—has studied dental surgery in America and enjoys a large and profitable practice. As a further proof of this growing need, a comparison of the number of dentists to that of physicians is worthy of consideration. In the province of Saxony, with a population of nearly 3,000,000 people, there are only 90 practicing dentists, 41 of whom are in the government district of Magdeburg, 29 in the district of Merseburg, and 20 in the district of Erfurt. In the last district named there are 10 physicians to each practicing dentist; in the district of Magdeburg, 14; and in the district of Merseburg, 20. From these figures, which have been obtained from reliable

sources, it is quite clear that there is an excellent opportunity for young dentists, and especially so for young American dentists conversant with the German language, to locate and build up a practice in some of the many comparatively large and flourishing cities of this province. It is only fair to assume that honest efforts would be crowned with success, as in the larger cities, like Berlin, Leipzig, Dresden, etc., where American dentists have already located, they are at the present time, in the majority of cases, enjoying enviable success.

Unfortunately, a few years ago a number of so-called "American dentists" with spurious titles brought American dental titles in general in bad repute. However, these matters have been adjusted, and at the present time, by taking the proper steps, competent dentists, graduates of reputable colleges, can establish themselves here and practice unmolested.

ILLEGAL PRACTITIONERS.—May 5, an application for a writ of mandamus to compel the State Board of Dental Examiners to examine a dentist of St. Joseph, Mo., was filed at Jefferson City. The petition attacked the constitutionality of the law passed by the last legislature which prohibits dentists practicing without a license, unless they are graduates of some recognized school or had licenses at the time the law was passed. It appears that the petitioner attended a dental school which failed before he secured his diploma. He has been practicing in St. Joseph for about twelve years, and the board is about to institute criminal proceedings against him.—May 24, a man who has been acting as a qualified dentist at Wellsville, O., was arrested on the grounds of practicing without a license.—May 22, an application was made at East Liverpool, O., for the arrest of a man who, it is claimed, has illegally practiced dentistry at Clarkson.—May 28, at St. Louis, Mo., the circuit judge refused to grant a dentist an injunction restraining the State Board of Dental Examiners from trying him on a charge of representing himself as another dentist.—May 30, a man of St. Louis, who was arrested on a charge of practicing dentistry without a state license, applied to the Supreme Court for a release on a writ of prohibition against Judge Moore, of the St. Louis criminal court, on the ground that the law was unconstitutional, and the State Dental Board refused to examine him. A decision is expected within thirty days.—May 2, a dentist of Boston, Mass., was fined \$50 for permitting an unregistered employe to practice dentistry in his office. The aforesaid unregistered assistant was placed on probation on a charge of practicing without being licensed.—June 11 a man was fined \$50 at Kansas City, Mo., for practicing dentistry without a license.—June 8 a man in New York, who has been twice convicted and fined for the illegal practice of dentistry, was sentenced to six years' imprisonment on a similar charge and perjury.—June 6 a young dental student, at Boston, who had recently been fined \$50 for illegally practicing dentistry, had returned to him by order of the judge \$47 he had paid, owing to his sincerity in wishing to pay the remaining \$3, which he found he was unable to do.

DAMAGE SUITS.—May 1, a young lady stenographer of Waltham, Mass., recovered \$5,000 against the Boston and Maine Railroad Company for personal injuries sustained in an accident in 1904, when she lost a tooth and suffered severe nervous shock.—May 1, a dentist of Denver, Colo., lodged his records of appeal at Denver against the Fidelity and Casualty Company of New York. Owing to an accident when operating upon a patient in 1902 he lost the sight of an eye, and being insured with the defending company he sought to obtain compensation. A Denver court in November, 1905, awarded him \$1,009.44, against which the company appealed.—May 2, a young woman of St. Louis, Mo., obtained a verdict for \$250 against a dentist of the same city, she alleging that one of his assistants extracted a tooth in such a way as to cause her to lisp, besides other ill effects.—May 3, a La Crosse (Wis.) jury awarded a man \$100 for the loss of a tooth, against another man with whom he had been fighting.—May 15, a patient was awarded \$106 damages against a dentist of Milwaukee, Wis. It appeared that there had been some misunderstanding over the cost to repair a set of teeth; the dentist maintained he should receive \$104, but the patient thought \$80 was the price, which he paid. Later the same teeth were returned for further repair, when the dentist demanded the \$24 balance and refused to return the denture. The plaintiff refused the dentist's demands, had other teeth fitted and brought action.—May 22, a lady patient sued a dentist of St. Paul, Minn., to recover \$1,000 damages, alleging that the defendant had locked her in his office and forcibly taken from her a set of false teeth on her refusal to pay him \$10 for them, which assertion was denied, and the jury failed to agree.—The widow of a former dentist has instituted suit against a dentist of Bridgeport, Conn., claiming breach of contract. The lady maintains that they agreed that the dentist should acquire the good-will, office equipment, etc., for the sum of \$1,350, besides which she was to receive 25 per cent of the earnings each month. It is claimed that he paid her \$650 and that since then he has ceased payments. She asks the court of common pleas for an accounting, for the remainder of the contract price and for \$1,000 damages.—At the beginning of May a \$2,000 damage suit was filed by a man against the two proprietors of a dental parlor in Hammond, Ind., owing, it is alleged, to the careless use of arsenic and other poisonous substances in professional work.—June 8 a woman was awarded \$550 damages against a Boston, Mass., dental company for injuries received and expenses incurred through having a tooth improperly extracted.—A St. Paul dentist was recently sued for \$1,000 damages by a woman patient. She stated that he forcibly detained her in his office until she returned to him a set of teeth for which she was not in a position to pay at the time.

ASSAULTS.—April 10, a dentist of Brooklyn, N. Y., was charged with assault. The case was dismissed.—April 11, a dentist of Atlanta, Ga., was charged with assaulting a Greek restaurant keeper, who, failing to appear, caused the doctor's discharge.—Early in April a patient entered a Paris

dentist's parlor and requested the extraction of a tooth. He had hardly become seated before the dentist assured him that he would remove all his teeth within a short time, and in spite of protests, wrenched out no less than eight teeth. His victim was quite helpless, being forced to submit at the point of a revolver. After shooting at and injuring two policemen, the madman was knocked down and secured.—April 16, a Minot dentist, while under the influence of drink, attacked his office girl. During the struggle which followed furniture was smashed and the girl lost a quantity of hair. After some resistance with firearms the sheriff placed him under arrest.—April 15, a dentist of Reading, Pa., was way laid and assaulted by two men. Although wounded, he managed to drive off his assailants, who seem to have secured only his revolver.—April 23, a dentist of Sparta, Tenn., was arrested on a warrant charging him with assault and attempted murder, and was lodged in jail.—April 21, a dentist of Indianapolis, Ind., was arrested for assaulting a woman whom he found, with a little girl, resting on his dental parlor steps.—April 27, the wife of a prominent San Francisco dentist made an attempt to murder her husband, two small children and several inmates of the Methodist Mission at Berkeley, Cal., where they had retreated after the earthquake. The woman also attempted to commit suicide, and was eventually removed to the Detention Hospital at Oakland.—April 30, a dentist of Terre Haute, Ind., assaulted, for a second time, his former employer. He was at liberty at the time on a bond for \$300, which had been entered into to insure his appearance to answer a charge for the first assault.—May 2, a dentist of New York was charged with attempting to murder his wife, he at the time being under the influence of drink.—May 8, a dentist of Biddeford, Me., was arrested on a charge of maltreatment of a 7-year-old girl.—May 16, a dentist of Cincinnati, Ohio, was dismissed on the charge of assaulting a woman, the judge holding that the evidence failed to substantiate the charge.—May 27, a dentist of Iowa City was sentenced to thirty days' imprisonment for beating his wife.—June 6, a dentist of Worcester, Mass., was charged with committing an unprovoked assault and was fined \$3.—June 12 a dentist of Chicago, Ill., narrowly escaped being shot by an infuriated husband who had called at his house for his wife, who had taken refuge there.